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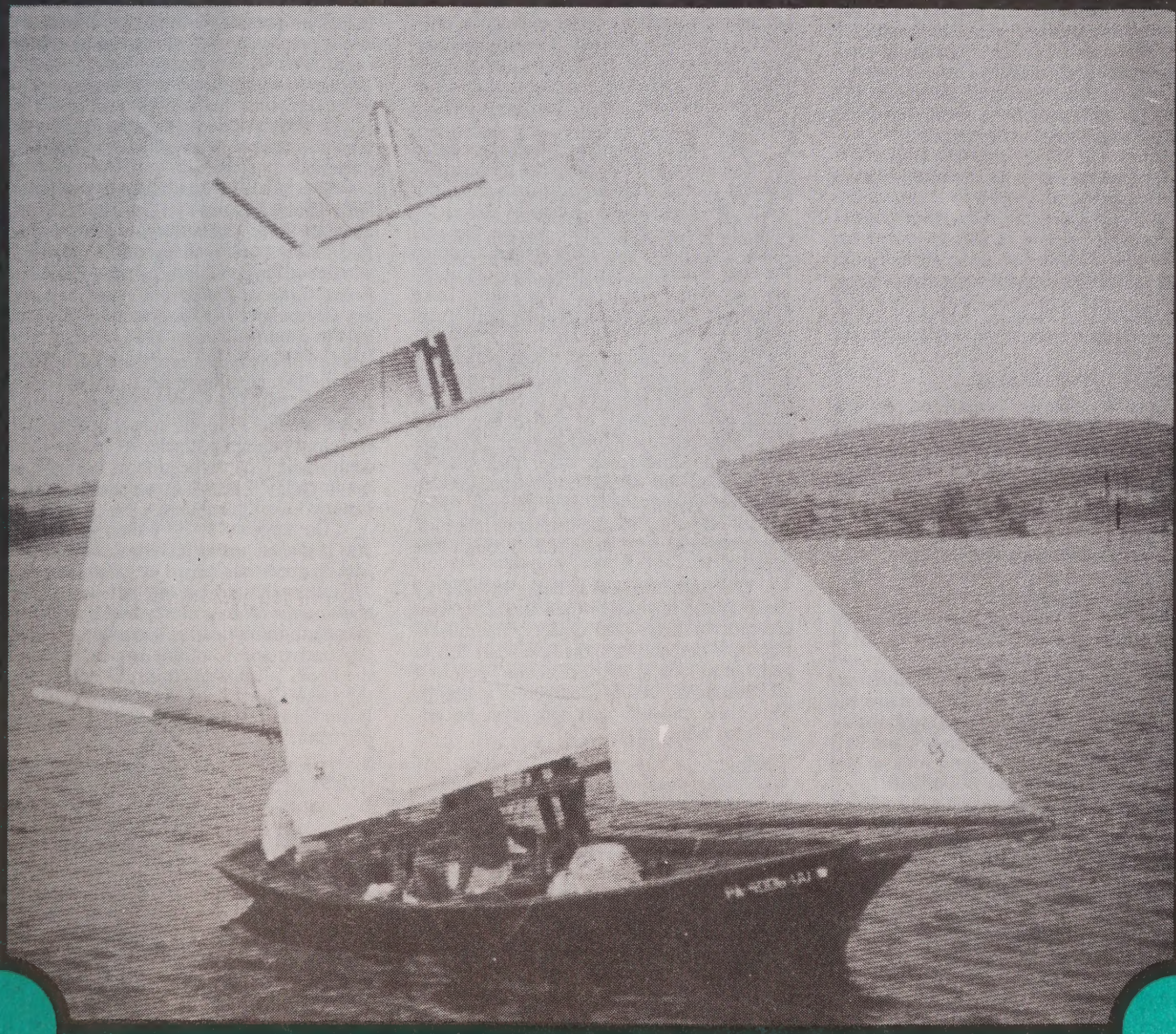
Special Features This Issue
Living Aboard Shantyboats
Lake Arthur Souvenirs - The Bronze Age

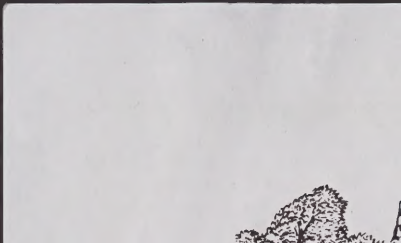
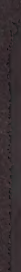


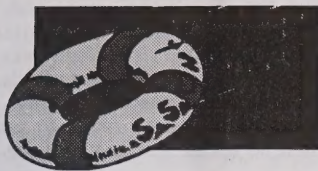
messing about in BOATS

Volume 14 - Number 19

February 15, 1997







Small Boat SAFETY

Jim Thayer sent on the following clippings from the newsletter of S.A.I.L., Sailing Association of Intermountain Lakes of Colorado. Food for thought, he suggests.

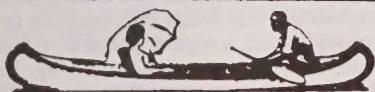
Accident at Chatfield Claims Annette Smith

Capri 22 Fleet 12 and S.A.I.L. mourn the death of Annette Smith, skipper of Capri 22 #705 and her nephew, Robert "Tate" Smith, who was sailing with her after his recent release from the U.S. Navy. She died as a result of an accident that occurred at Chatfield Reservoir southwest of Denver, Colorado, during a Wednesday night race June 26, 1996. Annette's crew, Geri Westkoff, Jacqueline Battles and Georgia Simpson, survived the accident. It appears that an abrupt windstorm with speeds up to 60mph capsized her boat along with several others. Three of the crew were rescued shortly after the accident. Annette was found approximately one and a half hours later and died at a Denver hospital. Tate was found two days later.

Annette purchased her boat about two years ago and was very enthusiastic about sailing and sailboat racing. She participated in the S.A.I.L. Adams Cup last year, was a member of Women for Sailing and US Sailing and was actively racing with the No Coast Yacht Club at Chatfield.

S.A.I.L. Adams Cup At Heron Lake

...Several groans were heard at the skippers' meeting June 15th when it was pointed out that the Adams Cup rules required life vests to be worn at all times while racing. The women sailors felt that this was not fair as the men were not required to wear these items in the Mallory Cup.



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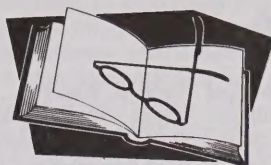
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Book Review

The Guide to Wooden Boats: Schooners, Ketches, Cutters, Sloops, Yawls, Cats.

Photographs by Benjamin Mendlowitz

Text by Maynard Bray

W. W. Norton & Company, New York, London

167 pp. \$19.95

Reviewed by Kent Mullikin

In my attic there is a stack of Wooden Boat Calendars, out of date, collecting dust. The combination of Benjamin Mendlowitz's superb photography and Maynard Bray's spare prose is just too good to throw away. Hence, I welcome *The Guide to Wooden Boats*, a small treasure of a book containing a generous sample of the work of Mendlowitz and Bray with the bonus of an appreciative foreword by noted designer Joel White. Such credentials mark this publication by Norton as a product of the wooden boat renaissance whose Florence is Brooklin, Maine.

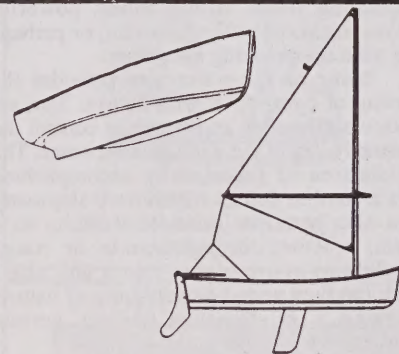
As Joel White observes, Mendlowitz's photographs are distinguished for their catching boats at the most favorable angle and for their remarkably dramatic lighting. I know no contemporary marine photographer who sets up a boat better, who captures the glow of wood and water more subtly or who uses back-lighting more effectively. Though the reproduction of the photographs in this little book lacks the stunning clarity achieved in the Wooden Boat calendars, these images still look very fine. Maynard Bray's knowledge of wooden boats is matched by his love for them, he knows and deeply appreciates just what he is looking at. His comments lead the eye surely to the salient details of design and deliver informed insights on the sailing qualities of the boat under scrutiny, all the while maintaining a pleasingly unpretentious style that makes the

reader feel included in a very interesting conversation.

The book is organized by rig with a section each on cats, sloops, cutters, yawls, ketches and schooners, a progression most sailors will find more logical than that suggested by the cover and title page where the book designer stacked the terms in descending order of word length. Each section opens with a page of Maynard Bray's comments on the rig in question, illustrated on the facing page with a print by the author's daughter, Kathy Bray, whose delicate renderings are another attractive feature of the book.

Within the various sections there is a bounty of good boats, 136 altogether, ranging in size from the 7'7" Nutshell pram to the 132' Chesapeake Bay ram *Victory Chimes*, and in date of construction from the 1870's to the 1990's. Wooden boat lovers will find a number of old favorites portrayed. In addition to representing builders on both the east and west coasts of the U.S., the collection includes the work of boatyards in eleven other nations from Denmark to Thailand. Many of the great designers are represented, Crosby, Crocker, Crowninshield, Fife, the Herreshoffs, Luders, Starling Burgess, Murray Peterson, Alden, Sparkman and Stephens, Rhodes and others. The book also contains a useful glossary of design terms and a thorough index. In all, this is a well designed and well executed piece of work, sufficiently compact to stow aboard even a little boat if you are lucky enough to sail in waters where you might encounter and identify some of its intriguing subjects, or in the winter months a pleasant companion in the armchair by the fire.

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You write to us about...

Your Opinions

The Appeal of Water

Most people are fascinated by water whether seen from ashore or aboard a boat. I find that when I'm ashore, even in a strange town, I eventually gravitate toward the water. Perhaps it's because it's everchanging, always moving, always different, never the same. Flat on windless days, small ripples in a light breeze, reflecting like thousands of jewels off small waves as the wind picks up, then the flash of whitecaps as the wind increases, and finally the awe-inspiring force as large waves break. But always moving. Maybe it's the sound of wind sighing through the rigging, or the bubbling of a wake, or the burbling of the bow wave or the crash of waves along the shore.

Even the smell has appeal ranging from the salty tang of the ocean to the pungent smell of earth, riverbed and water on a small stream. Then there's the tactile sensation of spray hitting you in the face or the feel of the water as you let your hand trail in the wake or the resistance of the water as you dip in a paddle or oar. So the allure of water is really a sensual experience encompassing all of our senses, sight, sound, smell and touch. But then, it's more than that.

It also has the potential for mystery and adventure, large or small. What lies beyond the horizon or round the river bend? What will the weather and wind be like later on? When will we reach the next port and what will it be like? What will I see that I've never seen before? This is compounded by the underlying threat or promise of nature; an impending storm, strong winds, powerful waves, rapids or a strong current, or perhaps the wind disappearing altogether.

Being on the water also provides the feeling of connection with nature. You are both working with and trying to control the natural forces of the wind and the water. The satisfaction of successfully accomplishing this is hard to define. If you have shipmates you also have the bond of working as a team, whether through gentle or rough conditions; you coalesce into a unit along with the boat and the conditions of nature, forming a relationship beyond normal friendship.

Finally, there is the feeling that the water has "always" been there and will be there long after you're gone. A contradiction in itself, it is a continuously changing constant. If you're in a philosophical mood you might think about the evolution of humanity and its progress from the oceans (some fish might dispute the term "progress"). And there is also the subdued recognition that, no matter how benign the water may appear, it is a powerful force that can turn in an instant to a raging power. For me, however, the greatest appeal of water is that when I look at it, it makes me smile!

Mel Ross, Verplanck, NY.

Our World of Wood & Water

With our bodies mostly water, in an earthly environment much the same, it's no wonder that we have a thing about ships and boats. Although ships are the largest moving objects we make, in learning seamanship through small boat handling we can all exhalt our spirits in commanding nature by obeying her, in the sense that the wind and the wave are always on the side of the ablest navigator.

And ever since we dropped out of a tree (the original Fall from grace) we also have a thing about wood. Born into a cradle, and buried in a box, we are cosseted and contained by this renewable resource that shelters and sustains us in a multitude of ways. Here too we succeed by virtue of our craft in working this humble material, with its asymmetrical structure, its living response to moisture, its differential strength and spring, and its beguiling figures, subtle grains, and luscious colors. Because of all this the building and using of a wooden boat becomes a natural sacrament honoring our special indebtedness to the nature of our bodies, our environment, and to our material endowment.

Philip Thiel, Seattle WA.

Here's to All Small Boats

It's rare that I can find a magazine that covers small multihulls and monohulls all in one publication. I have built, rowed and sailed Bolger's Nymph and Tortoise, both fine projects. I have also built John Marples' 10' Seaclipper trimaran and raced it in the three meter class both in Seattle and here in Portland, Oregon. What fun it is when a group of these little trimarans get together.

Here's to all small boats, both monohulls and multihulls.

Ron Church, Hillsboro, OR.

Paddling the Cata-Canoe

The article by my friend James Denker about his wonderful Cata-Canoe system tends to lead the reader towards motoring only. He fails to emphasize the quality paddling you get when canoes are joined together. When paddling, the joined canoes are easier to control; especially if one or both bow paddlers are not as strong as the stern paddlers (the ladies in our case). Correction can be done by just one of the stern paddlers.

In one of our first expeditions to test the system, we paddled the North River in Scituate with three canoes joined. My experience was utter amazement! I could walk about as though I was on the QE2 (in a small room)! I'm in my seventies and usually have trouble keeping up with my younger friends. Now that problem is solved by Cata-Canoe! Another very joyful experience is picnicking without going ashore. There's no problems with rafting-up together; you're already there! Just hand stuff around on the flat of a paddle.

As with most tidal rivers, the North River winds back and forth. It being low tide, us guys were standing up in the stern of each canoe to look around. We noticed the approach of a large, fast powerboat (not

observing the "No Wake" rule) and were prepared to take our seats if the situation demanded. The 1' to 1-1/2' high wake was no problem; the canoes pivoted a little fore and aft and we remained standing. This unnerved the powerboat captain to such an extent that he damn near rammed the river bank!

Last year, my canoe joined with the Denker's and we did the Great River Race on the North River. For some reason the race committee didn't notice our lady paddler and put us the men's class. Not even the "old" men's class. Well, we weren't last, and managed to beat even one or two kayaks which started ahead of us and one or two canoes as well. We even stopped to rest at one point! The Cata-Canoe system drew lots of attention from both onlookers and participants. At some point in the future I'd like to see six or eight of us joined together for an armada!

I live on the Gulf River in Scituate and use my wheel system every time I go out on the river. In my younger days, dragging my canoe over the marsh was quite a chore. I made a homemade dolly to ease the task, but had to tie the canoe down to the dolly as it would slide off easily. The Cata-Canoe wheel system solves that problem and also handles the rough woods road I use to get to the marsh.

In the photo in your article, my canoe is the middle one. You'll notice I have a 1967 Old Town Carlton canoe with wide molded gunwales. A special Cata-Canoe bracket fits even this old model. Having an amphibious canoe is great for my tired old back.

Cata-Canoe keeps friends together; on the water and off!

J. Neal Gray No. Scituate MA.

Your Needs...

Borates Environmentally Friendly

I read with interest the article *Preservative Treating a Wooden Boat* by Five Points, Inc. in the January 1st issue. Their research, which indicated that sodium borate could control rot in wood, agrees with findings of earlier studies dating back at least to 1937 and the work of R. H. Baechler reported in the *Annual Proceedings of the American Wood Preservers Association*.

Hydrated sodium borate (borax) by itself is not very soluble in water, but when combined with boric acid (47.5 parts borax + 52.5 parts boric acid), the mixture becomes much more soluble in warm water ~86 F and diffuses more easily into damp wood (dry wood is not conducive to penetration of these chemicals). Because subsequent wetting can leach the chemical from the treated wood, a regular preventive maintenance program as suggested by Five Points, Inc. is a wise precaution.

Borates are indeed the most environmentally friendly preservative I can think of, but what is that carcinogenic pentachlorophenol referred to in the article? Might it be pentachlorophenol which, along with creosote and the arsenicals, were all banned from over-the-counter sales, but which may all be used by approved applicators?

D.J. Miller, Corvallis, OR.

Oil Drum Heater Kit

In the GEAR WANTED section of the classified ads in the January 1st issue, Bob Whittier asked for sources of castings used to convert oil drums into wood stoves. Northern Hydraulics Corp. offers a complete conversion kit for about \$30 in its Flyer # 508. This company sells tools and many hard-to-find items of use to boaters via mail order. For a free catalog phone (800) 533-5545.

Sam Overman, Dahlgren, VA.

Tugboat Info Updates

I'd like to submit some changes to my recent article, "Tug Info Resources". Things have happened since I put the manuscript into your editorial hopper last September.

1. Down East Books stocks *On the Hawser* at \$60 plus \$5 for UPS. The address given in the article will work but they do have a box number if you are anxious about simple addresses, PO Box 679. Their telephone is (207) 594-9544, fax (207) 594-7215.

2. However, *On the Hawser* is available at a lower price, at least for a limited time. My favorite seller of remainder books, Edward R. Hamiton, bought some number of copies and is selling them, stock #30316X, for \$42 each plus \$3 P&H, cash or check only. His mail address is: Falls Village, CT, 06031-5000 (how do these book publishers get away with such simple addresses?)

3. The annual dues for the Tugboat Enthusiasts Society have gone up to \$30 for US and Canadian members (presumably US dollars in both cases) or \$40 for foreign members.

4. The current address for the International Retired Tugboat Association is 6145 Genoa Road, RR1, Duncan, BC V9L 1M3, CANADA, and dues (as of last fall) are \$13 (US), \$15 (Canada).

5. Jack Gaston's book, *Tugs Today*, is available through better booksellers or from Motor Books International, 729 Prospect Ave, PO Box 1, Osceola WI 54020-0001. Their telephone is (715) 2943345, fax (715) 294-4448.

Hugh Ware, Manchester, MA.

Source for Air Rollers

Does anyone know of a source for air rollers for light boats? I have an old one I bought from Lands End 25 years ago when they were in boat gear supply. It is rubberized canvas, about 4' long and 10" in diameter when inflated by mouth.

I've rolled over my 300lb Albacore on it over beach pebbles.

John Duncan, 7800 Buckboard Ct., Potomac, MD 20854.

This Magazine...

More Good Ideas

I enjoy the magazine very much. You report more good ideas and stories about small boats that any other source. In years past, I have subscribed to *WoodenBoat* (too many articles on how to make a mahogany wheel and all of the intricate details of plank on frame construction which only a minuscule fraction of the population, not including me, will ever put to practice), *Cruising World* (too repetitious, too many

articles supplied by technically incompetent readers), and *Small Boat Journal* (it was great but you know what happened to it and I'm not a bass fisherman) but find now that, of the current magazines, only *Messing About in Boats*, *Coastal Cruising*, and *Boat Design Quarterly* cover my boating interests well enough to be worth reading.

Roger H. Schneider, Bethesda, MD.

Reference Articles Wanted

Presently I have a folding Big Glider, Folbot, plus the fiberglass Super Model, utilizing the Balough 38sf Batwing sail. I'm debating acquiring a Dovekie, or a Catspaw sailing dingy, West Wight Potter, or a Whitehall with a sailing rig. I am leaning more toward the West Wight Potter or Catspaw dingy, something that is easy to handle, and store.

If you have some articles on these craft I would appreciate it. If there are any extra costs for this just bill me.

Floyd W. Beam, Bensalem, PA.

Editor Comments

I have as yet not put together a comprehensive index of past issues so I cannot tell which, if any, carry articles about any specific boat. Going back through them to look is not a possibility, and the index still is in the future, both because I cannot spare the time for these time consuming tasks.

December 15th Issue Was Terrific!

I wish that I could shrink me down and slip into the tugboat. The coverage of the Mid-Atlantic Small Craft Festival was just plain fun. I have a house on the Chesapeake at Mobjack Bay. One of these days I will jump from New York to Virginia and get the renters out. The sailing is great and so are the crabs.

Really excited about the Erie Canal piece. I've been thinking of a barge trip for years. Now is the time, or at least when Spring comes.

My wife and I chartered a 40 foot steel house boat in the late fall many years ago in the Thousand Islands on the Canada/US border. Best vacation that I've ever had. There were almost no people on the water. The few Canadians who we met were really good folks. Lots of old wooden boats and wonderful boat houses.

Paul Liebow, Port Washington, NY

Mail Delivery...

Cover Only Arrived

The cover of my December 15, 1996 issue arrived without any internal pages. They had all been ripped out, apparently by some event in the mail process. The two staples that effect the binding had been ripped out of the cover. Could you please send me a replacement?

Roger H. Schneider, Bethesda, MD.

Two at a Time

I also was one of your subscribers who received two issues at the same time and wondered if you had mailed them that way. Your recent commentary answered my question.

Ed Phillips, Pensacola, FL.

Every Copy Ripped

Your commentary in the December 1st issue about mail problems finally prompts me to report my situation. Starting with the July 15th issue my copies have been coming to me looking as if they've been used to beat off an attacking enemy.

Every copy is ripped on front and back, corners are crushed, the open edge has some sort of embossed dot track along it and the back cover looks as if it had been bound with a 1/4" strap and slid across a dirty floor.

Prior to that issue they generally came through with little trouble. I notice that the code on the mailing label changed to a completely different one at this time.

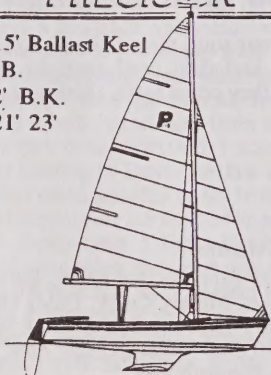
Ron LaLumendiere, Cape Girardeau, MO 63701.

Publisher Comments

We make good on any subscriber problems when we know about them. Let us know if you are having persistent problems of delivery. Please, though, be aware of the long time it often takes an issue to get to you. We mail about two weeks prior to cover date. Wait until two weeks after cover date before asking about an issue, by then it should have arrived and so you do have a problem, which we will rectify as it requires.

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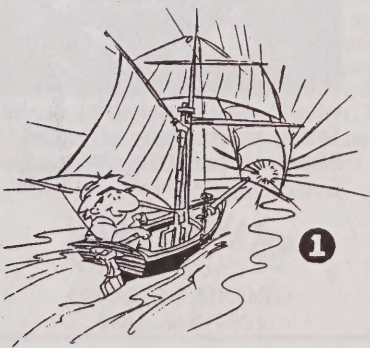
..."In your soul, these visions keep, safe from time's tarnish and dust until twilight, from whence summoned they come forth, shining and new..."

By Lee Hartman

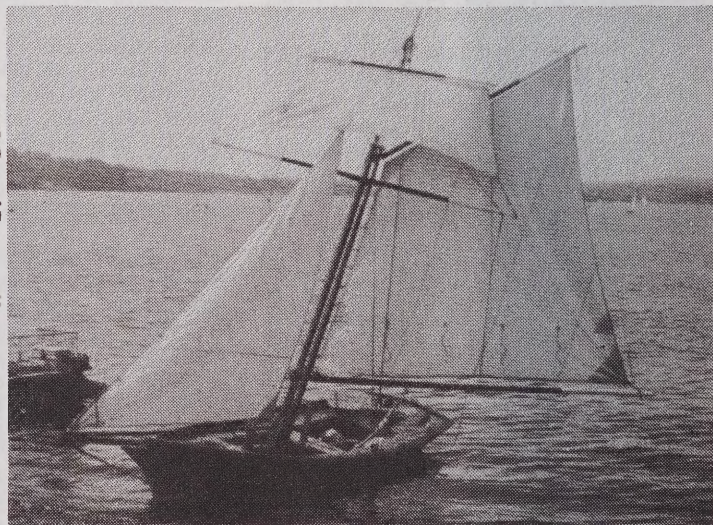
Bear Run, Hidden River, Barber Point, Lost Cove, Muddy Creek, Davis Hollow. To me these names conjure up Lake Arthur, the centerpiece of Moraine State Park in Butler County, Pennsylvania.

Stretching more than six miles east to west, the lake is enclosed by 40 miles of beautiful rugged shoreline encompassing 3,225 acres of water, blue on some days, black on others, gray, brown or green in between, where on any of its several fingers (excepting Bear Run, where sailboats seem never to go) the sailing man can expect wind, anything from a breeze to a gale, most days.

I spent time there once in *The Sloop John B*, a vessel of wood, built by my own hand from my own plan and aboard which I adventured for seven summers.



Bear Run Landing with *The Sloop John B* hauled ashore.



Deliverance in "One Way Strait"

There are two islands in the lake, neither of them named, which doesn't seem right, all islands should have names. One of them is part of that system of backwaters in the Hidden River area and the other lies off the south shore just below Windy Knob. A narrow, rock-sided channel separates it from the wooded mainland. About 70 feet across, this channel runs east to west and the wind can only blow one way or the other.

Nobody ever sailed through the strait, possibly out of fear of being shot by irate fishermen angling from its banks.

I had often skulked around one entrance or the other and noticed that on many days no fishermen were present. Could a boat sneak through on such a day without getting caught?

What I was contemplating entailed mortal danger. Blind rage consumes a fisherman when he thinks a man in a boat has frightened away his prey. Tearing of hair and biting of anything within reach (sometimes fishing rods are bitten completely in half) are common occurrences, and the wise boatman will shy away from these occasions just as he would avoid teasing a pit bulldog or petting a wild cobra. But nothing is quite so attractive as forbidden fruit.

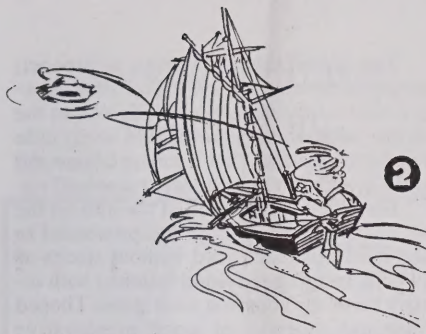
There finally came a day, a warm sunny day with wind from the west, when the cool

green fairway stretched before me, beckoning, its banks devoid of any sign that anglers might lurk there. Driven, I swear, by hands other than my own, the *The Sloop John B*, squared away and headed for the straight. As the entrance fast approached, rapidly shoaling water revealed a bottom of sharp angular rocks that would have deterred a prudent man, but I sailed in the grip of some terrible madness. A pounding, pounding, like the music from "Jaws" pulsed in my brain as I lifted the centerboard and shoved home the wooden pegs that held it in place. Seconds later I was in the channel, wind astern, with no chance of turning back.

It was strangely peaceful in there with the banks going by on either side. Overhead a ribbon of blue sky, edged with tall tree branches, flowed like a river of its own while the only sound was of water gurgling along the hull. It was like church, church, was that organ music? No it couldn't be, but still...

The enchanted passage ended 300 feet downwind at the eastern end of the straight where a blue heron waded along the shore, the only fisherman I encountered.

Thereafter I named the place "One Way Strait" and took every opportunity to sneak through. Native Americans would surely dubbed it "Place of Big Medicine," and never, in seven years, did I see another boat go in or come out.



The Rude Straw Hat

Nothing keeps the sun off you like a straw hat, not just your face (a baseball cap can do that) but your ears and the back of your neck as well. A rude straw hat, loosely woven, will allow air to circulate freely, it costs little, occasions small worry if lost and looks better and better the older it gets. On a sweltering summer day, nothing feels quite like dunking your old straw hat overside and plunking it down on your head soaking wet.

One windy day off Nealey's Point, running northeast before a stiff breeze, *The Sloop John B.* was struck by an unusually hard gust that lifted and carried my straw hat some 40 feet to where it landed in the water. When confronted with a man overboard situation in a sailboat, the best thing to do, I've been told, is to turn immediately into the wind and, if the wind is behind you, do it with a jibe. By the time I took action I'd already passed the floating hat.

I hauled in the mainsheet while nudging the tiller to starboard, turning *The Sloop John B.* to port and bringing the after edge of her mainsail into the eye of the wind. The boom carried violently across the boat. The trick here is to let it go let it run free until the boat comes all the way around into the wind on its new tack and only then haul the sheet taught.

One hundred and fifty feet to windward my hat seemed on the verge of sinking. I imagined it flailing its little arms and making pitiful cries for help and I shouted, "Hang on old friend! I'm coming! I'll save you!"

It was then I noticed an audience of three sitting in plain view, and hearing, in the cockpit of a yellow sloop that had previously been following at a distance but now had overtaken me. With my peers looking on, I held the leg an extra length of time to be certain of reaching the hat on the next tack and, as luck would have it, after tacking I came to a stop a foot short with just enough time to snatch it from the water before falling off downwind. To the three men on the spectator boat it looked like perfect timing and they broke into enthusiastic applause, which I accepted with a bow, doffing of my rude straw hat and plunking it down on my head soaking wet.



A Close Shave on Barber Point

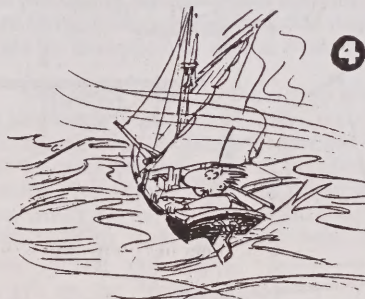
I'd done it again! Only 50 feet from shore I had at least 200 feet to go before weathering Barber Point. I should have tacked several minutes before when I had some speed. Now, pinched up close in the light breeze, I might not be able to tack at all.

I often talk unhappily to myself: "Just like you said," I went on, "you've done it again! The wind's backed. You'll have to go with it. Pinch any closer and you'll stall. We're almost stalled out now. Damn! You're never going to make it, never going to make it. Look at that bottom! It's all rocks, sharp rocks that could poke a hole in any boat. A person could break a leg on those rocks. It looks like you're going to have get out and push. Not now you idiot! Wait till the last minute. Hey, it's veered a little, blowing a little harder maybe. It is! We're not sliding nearly as much. Maybe we'll make it after all."

The Sloop John B., crawling along at one mile an hour, and by then only 12 feet from the wooded shore, had 30 feet to go. Beyond the point open water, all you could ever want on either side, would make it likely the sloop could go without tacking all way to Davis Point, all the way to where Route 528 crosses Lake Arthur on the high bridge, all the way to the end of navigation in Muddy Creek. Counting the mile already sailed from the launching ramp at Bear Run, that's over six miles.

Then it was ten feet. "Just another ten feet without piling up on the damned rocks and we've made it. We should have struck by now, the board must have found some crazy channel between the rocks. We're going to make it! We're going to make it!"

The shore fell away, Watts Bay opened to port, we'd weathered Barber Point. "I knew it along all along Piece of cake!"



Never Mock Aeolus

In his autobiography, in which he describes the escape of the *U. S. S. Constitution* from a squadron of British warships under command of Philip Bowes Vere Broke, First Lieutenant Charles Morris of the *Constitution* relates events of July 18, 1812, and I quote:

"In passing the lee frigate at five, we expected a broadside or more as we would evidently pass within gunshot, but for some unexplained cause Lord James Townsend, in *Aeolus*, of 32 guns, suffered us to pass quietly and tacked in our wake while the others soon took the same direction."

The bright red hull of *Aeolus II* would have set her off from others admirably except that there were, at the time, several red-hulled sloops based at Lake Arthur. She was a 26-foot cabin sloop owned and sailed by the Buckleys, a family of husband, wife, one son and one daughter who made their home then in Beaver, Pennsylvania, and who could be

found at the lake most weekends. It was Candi Buckley, the wife, who I knew best. Often we carried on conversations sailing side by side or when I would heave-to next to where the Buckleys lay anchored, awnings rigged, lazying away a summer afternoon, often reading books. The Buckleys were at home on the water.

Aeolus II had not been named after Lord Townsend's frigate of 32 guns, but after *Aeolus*, a daysailer the Buckleys had owned before moving up to the sloop.

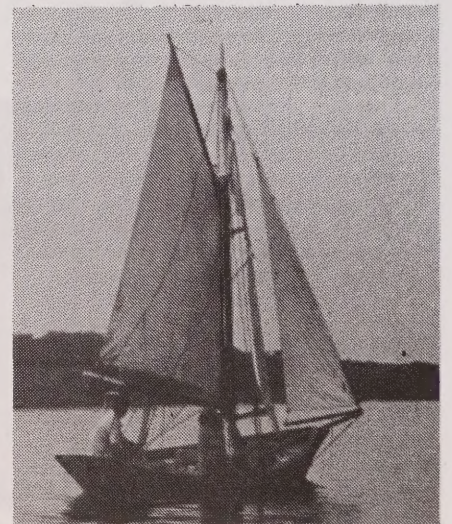
In the late 1980s, an ocean going sailboat hull moored along the banks of the Monongahela River south of McKeesport often attracted my attention as I drove by. I was tempted again and again to stop and inquire about it but never did. The now defunct *Pittsburgh Press* ran a feature article about the boat, which it turns out was *Aeolus III*, owned by the same Buckleys that had owned *Aeolus* and *Aeolus II*.

They had chucked it all, quit their jobs, sold the house, taken the kids out of school and were spending several months getting used to life on board before sailing away on their 46-foot ketch to fulfill a dream wherever the winds would take them. I've often wondered if they found what they sought.

All three of the Buckley's boats, and Lord Townsend's 32 gun frigate as well, were named in honor of the original Aeolus who lived with other gods and goddesses on Mt. Olympus and to whom Greek sailors prayed in times of old. He was brought to Rome in war galleys a thousand years later where he was worshipped by Romans as well.

Aeolus, ancient god of wind that blows over water, over land and over all the world!

It was a brisk wind hard from the west, perhaps with a little north in it. I stood on the restaurant landing in Davis Hollow trying to make up my mind whether or not to break out the Sears Gamefisher 3.5 which I kept stowed under the cockpit seat. I didn't like being intimidated by the wind, but there was only one of me and the boat was heavy. I didn't know if I could get it back on its feet in the event of a knockdown, I've never been knocked down. The closest I ever came was sailing the rail under in this same channel about half way between where I stood and where Route 528 crosses Lake Arthur on the high bridge.



I admired my handiwork with the reef points. The mainsail, its bottom lifted and tied, had taken a nice draught and its total area had been reduced by a third. I decided to sail back to Bear Run with this rig.

Courage failed in the high wind and gusts that howled in the rigging beyond the Nealey's Point Narrows. I struck everything and would have broken out the Gamefisher, but pride and anger again stayed my hand.

I determined to set the jib and sail with it alone to Bear Landing. Of course, the jib would have to be moved a considerable distance aft, and I set to designing a whole new rig. I drifted half an hour working on it, eventually attracting the attention of the Fish and Boat Commission Patrol Officers who stopped by to ask if I needed help. "I'm doing just fine, officers, thank you." They gave me best wishes, waved goodbye and sped off on other more important business.

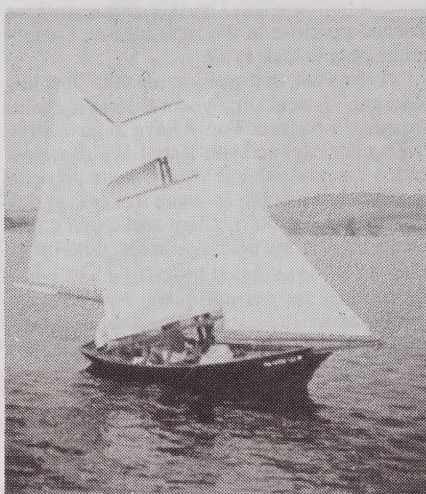
I made the jib's head fast to the gaff and hoisted away. From there the jib led downward outside the shrouds to the port gunwale. I had decided to start on the starboard tack where it was made fast to a cleat forward of the deadeye. The jib sheet was made fast to the main boom and adjusted by easing or hauling taught the boom sheet. Changing tacks required that the jib's foot be detached and passed behind the shrouds and mast to the opposite side, where it was made fast again. All being ready, I sheeted home.

We were underway immediately with a fair turn of speed. My new rig stood upright in the angry wind; my fears fell away. In triumph I dared the elements: "All right you 'blankety blank' son of a 'blankety blank'! Now let's see you blow! Go on blow, you 'blankety blank blank'!"

Thus did I mock the gods. No sooner did these oaths pass my lips than a tremendous gust, like a raging lion, roared out of a cloud and sprang at my little boat, laying her over until water came over the lee gunwale. She would have swamped but I got her rounded to in the nick of time. Flogging, snapping, lashing fearfully back and forth, the jib threatened to tear itself to pieces. I lowered the gaff and, when on deck, shoved the sail under the seats beyond reach of the wind that never ceased snatching and tearing at it as though bent on its complete destruction.

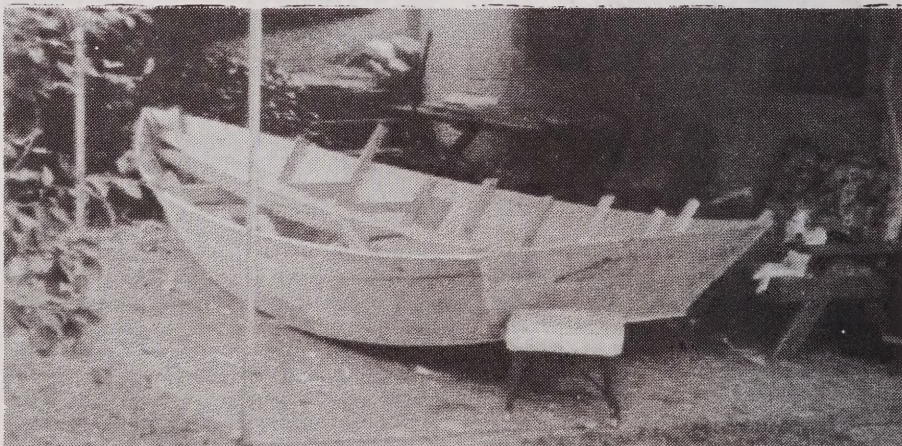
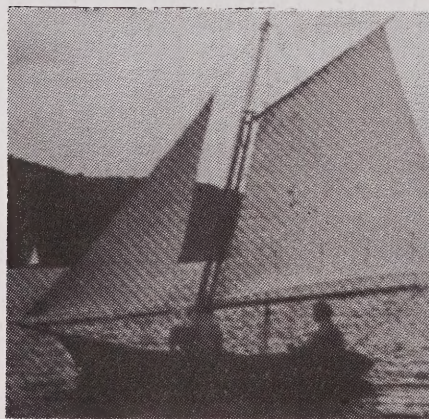
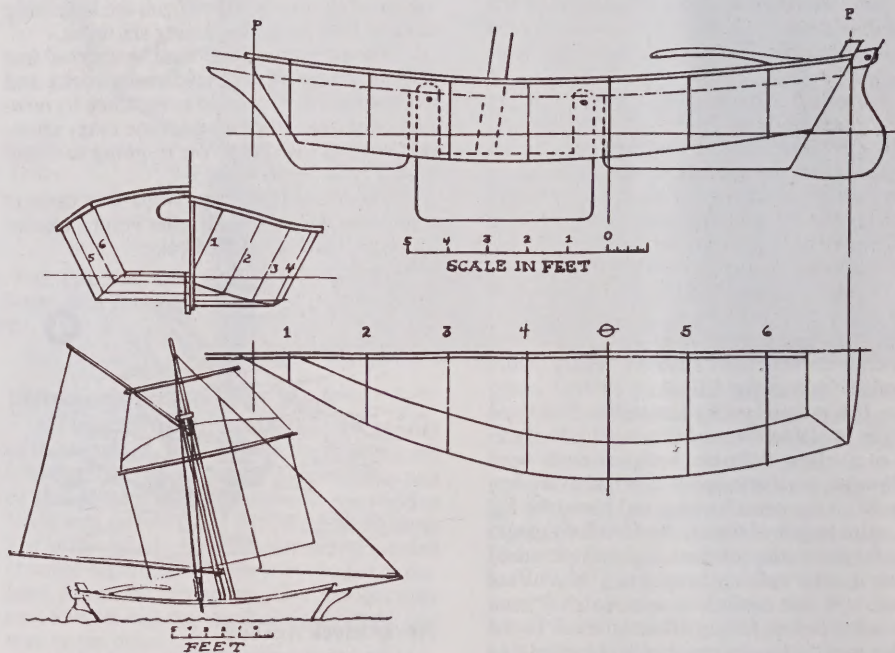
The wind still whistled, it would for the rest of the day. Chastened, I took the Sears Gamefisher 3.5 from beneath the seat and mounted it in the motorwell. A pull of the cord brought it to life. I wrapped myself against the storm using a fold of the jib and motored towards Bear Run Landing.

The Sloop John B.



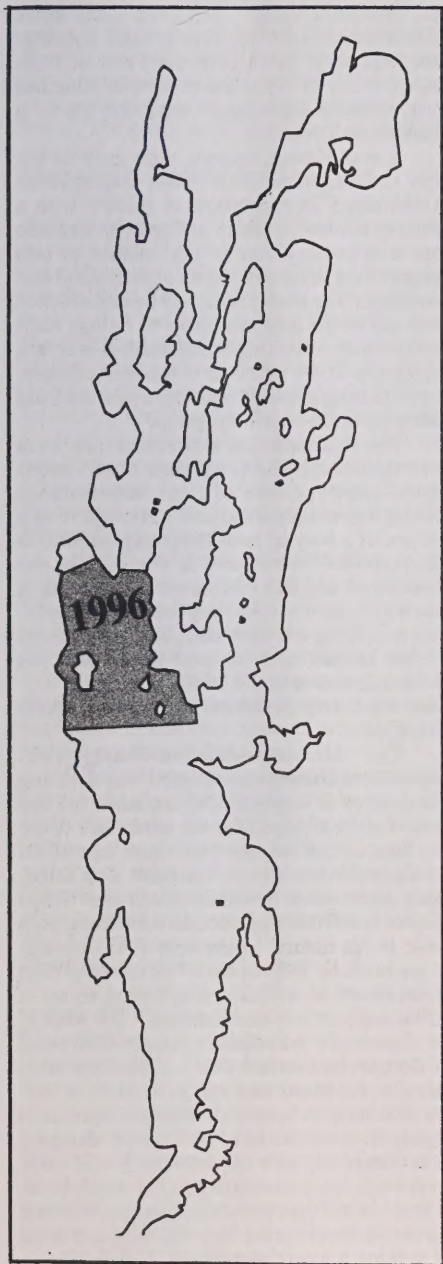
The Sloop John B. started as a pencil drawing in the winter of 1979. From that drawing I built a tiny scale model 1/2-inch to the foot that, when finished, revealed a lovely little sloop 16 x 6 feet that flew a square course and topsail in addition to its steeply raked gaff rig.

Early that spring I lofted the hull on the wall of my one-car garage and proceeded to build her in the back yard without stocks of any kind, using cheap wood fastened with ordinary hardware bought at local stores. I hoped a thorough sloshing of wood preservative would fend off rot and a fiberglass skin make her waterproof. After a very fast start construction slowed, dragging on into late August. Having missed the season, I finished her in the garage over the winter. Snowy nights found me down there carving wooden cleats or turning deadeyes, but I never mastered the planned wooden blocks, settling instead for cheap aluminum ones. I am no slouch as a carpenter, and *The John B.* is the fifth boat I've designed and built over the years. It seems that a good rule of thumb for judging the time it will take to build a wooden boat might be: "For every piece of wood in the boat, be it large or small plain or fancy, the time allotted to trace, measure, cut, carve, bend, install, and often correct and reinstall, should be at least one hour."



Surveying Lake Champlain

By Art Cohn



This season the museum began its most ambitious project to date, a systematic examination of the entire bottom of Lake Champlain. Working through some of the nastiest weather anyone can remember, our team utilized state-of-the-art remote sensing equipment to survey over 40 square miles of lake bottom. Akin to examining the surface of some distant planet, information was captured from places which had never been imaged before. In the process, at least ten new shipwrecks were discovered and a huge volume of data was collected about the lake's geology.

The accelerated lake survey was planned as a response to the invasion of zebra mussels. Sadly, we predict that in the next several years all the lake's shipwrecks within 100 feet of water will become covered with this non-native species. A related mussel, the

quagga, may threaten shipwrecks in depths of over 200 feet. These conclusions were produced in a study which the museum conducted on the impact of zebra mussels on historic shipwrecks. This Lake Champlain Basin Program funded report is now available.

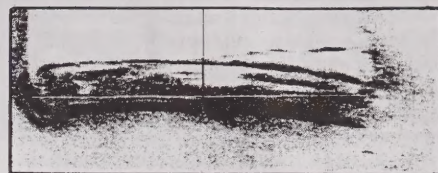
While the study's conclusions were ominous and the options limited, one positive recommendation called for gearing up to locate and document the lake's shipwrecks *before* this predicted colonization takes place. Using the Great Lakes as a model, we anticipate a short window of opportunity to locate and record these wooden time capsules. Up until this time, less than 10% of the lake has been examined and over 300 shipwrecks have been inventoried. We predict that dozens of undiscovered shipwrecks still lay on the lake bottom. With modern advances in survey technology, we should be able to find and document them.

Organized by LCMM Director Art Cohn, our survey team was up to the challenge. Veteran lake researchers Fred Fayette and Peter Barranco came together with frequent survey collaborators, Middlebury College geology professors Pat and Tom Manley. Seth Haines, Kathy Boumann, Dave Andrews and Mark Manley rounded out the crew. Working on Captain Fayette's specially equipped *R/V Neptune*, the survey team brought together side-scanning sonar guided by DGPS (Differential Global Positioning System) and assisted by autopilot. Peter Barranco, who has studied the lake's history since he was a teenager working with the late Col. Hagglund, designed the navigation and survey strategy. Pat and Tom Manley, with support from Middlebury College, provided the sonar system. They guided the data gathering process utilizing a new state-of-the-art data capture and post processing computer. This allowed us to store all the information collected in multiple forms for immediate as well as future analysis.

During the course of the survey at least ten shipwreck targets were located. As of this writing, our dive verification team has been able to examine five of them. All five are wooden 19th century vessels: a construction scow which was burned but contains over 70% of its hull; an "enlarged" canal boat, completely intact and sitting upright on the bottom; a steam-powered, propellor driven tugboat, ca. 1880, completely intact and upright on the bottom; and two ca. 1840 sailing canal boats, one with a wooden windlass which was apparently scuttled, and a second, which is one of the most well preserved shipwrecks located in Lake Champlain.

Wreck "F", as it is designated, sank in extreme circumstances and contains its cargo of coal and every element of a vessel which one moment was fighting for survival, and the next minute was submerged under the lake. We currently do not know the identity or the circumstances of this

vessel's sinking. It appears to be an almost new vessel with 100% of its shipboard and personal features present. All five wrecks were preliminarily examined and videotaped.



Support for this season's survey was provided by the Lake Champlain Basin Program's Cultural Heritage Office with funding from the EPA and the National Park Service. Strong cooperation was received from Senator Patrick Leahy's office. We are forging a public-private partnership for the survey having also received generous support from the Lintilhac Foundation and a second Vermont foundation which wishes to remain anonymous. We are already planning 1997 operations which will focus on three specific areas. We will continue our collaboration with our core team and Middlebury College to expand our bottom survey. We plan to implement an ROV (remote-operated-vehicle) documentation survey of the five deep water wrecks located this season. We will also continue to work with Kevin Crisman and the Institute of Nautical Archaeology at Texas A&M and the University of Vermont to continue the documentation of the shipwrecks located this season.

Several on-going initiatives will be flowing from this project during the winter. Preliminary analysis of the geophysical data will be undertaken by Pat and Tom Manley and several Middlebury College students. Management recommendations concerning specific underwater sites will be developed for New York and Vermont resource managers. A short film about the survey is being produced so that the survey process and results can be shared with the public.



Off Stave Island, the survey crew checks in with Bill Hazelett.



Messing About in Shantyboats with Shantyboaters

By Bill Foden

I'm taking my regular afternoon backyard cruise in *Serenity!* — *The Slowest Boat Afloat!*! — my homemade and designed 8' x 20' houseboat. I am still writhing over the remark made by an acquaintance to whom I had showed a picture of my lovely *Serenity* and he had said, "It looks like a shantyboat!" Well!! After I controlled my impulse to do bodily harm to him I just quietly told him it *was* a shantyboat. I invited him to come and visit my marvelous little vessel and perhaps take a turn at the oars on our next drift down the Maurice River. After all, I said to myself, this poor ignorant feather merchant is not really responsible for any erroneous ideas he has about shantyboats.

To him a shantyboat was a dilapidated piece of barely floating junk peopled by shiftless, ignorant, lazy bums who live by stealing everything in sight and trespass on the waterfront property of honest taxpayers. I realized that a lot of misinformation and inaccuracies have been circulating about shantyboats and shantyboaters for a long time now. In fact I was even surprised that he knew the word. I'm also sure he wasn't aware of some of the more distinguished citizens who were shantyboaters, Abe Lincoln for instance.

Abe Lincoln, Shantyboater

When Abe was sixteen in 1826, already an accomplished boat designer, builder and navigator, he built a flatboat with his own hands and made some pocket money ferrying passengers out to Ohio River steamboats. Then, in 1828, when it appeared that he wanted to join Robert Owens' utopian experiment with "free love" at New Hope, his father put him to work helping make a flatboat for a farmer named James Gentry of Pigeon Creek. Abe cut the planks for the flatboat's double bottom (my *Serenity* has a double bottom, too), made the deck shelter, carved out the sweeps, the check post and the setting pole for steering. Then it was time for the launch and a typical shantyboat drift down the river.

Abe's Drift Down the River

Abe was put in charge of the boat and, with Gentry's fifteen-year-old son as crew and a cargo of pork, flour, bacon, meal, potatoes and produce, they drifted a thousand miles down to New Orleans where they traded their cargo for cotton, tobacco and sugar and then sold the boat for what it would bring as lumber. Their voyage was fraught with the dangers of drifting through the snags and shoals of one of the most dangerous rivers in the world. At one of their nightly landings near

Baton Rouge they were attacked by seven blacks. They attacked the boys while they slept, trying to kill them and steal their cargo. Abe took a crabapple-tree club in hand and knocked all seven of them into next Tuesday and chased them into the woods.

By the time the disagreement as to who owned the cargo was over, Abe had a cut over his right eye that left a scar that he would bear for the rest of his life. The next time you're in Washington visit the Lincoln Monument and take a good look just over Abe's statue's right eye.

Defining a "Shantyboat"

Most of the readers of *WoodenBoat*, *Off-shore*, *Motorboating and Sailing*, or any of the boating magazines devoted to making and cruising canoes, kayaks or selling those boring and overpriced "cookie cutter" boats don't even know what a "shantyboat" is either. In all likelihood even an enlightened reader of *Messing About in Boats* may have never seen one at all and is unaware of the part played by shantyboats and their predecessors, the flatboats, that early on plied the rivers of America.

Who The Shantyboaters Are Today

The first flatboaters were not true shantyboaters as some of us think of them today. In the period between Civil War and World War II, a race of semi-amphibious "live-aboard" people had evolved that it would now be possible to define as "shantyboaters." They were quite distinct from the flatboat and keelboaters of Abe's time.



Virtually all we know about the shantyboats and shantyboaters of yesteryear comes from the writings of Harlan and Anna Hubbard. These two very special people undertook to emulate what had become an already endangered shantyboat way of life, built a shantyboat and drifted, without electricity, a motor, sail or any of the other things most of us have been brainwashed into thinking we "need" 1,385 miles down the Ohio and Mississippi Rivers over a seven-year period from Brent, Kentucky to New Orleans. They rowed, poled, mud-sailed and cordelled (moving a boat by tying a line to a convenient tree or rock and pulling yourself along) their 10' x

24' shantyboat (in true shantyboat fashion they never did give her a name), stopping in the summer to grow their own food and catching fish to barter for their simple needs, and drifted down the river in the fall and winter to the sound of the duets they played on Anna's cello and Harlan's violin. The Hubbards book "*Shantyboat — A River Way of Life*" (Lexington, Kentucky: The University Press of Kentucky, 1953, 1981) is the nearest anyone has ever come to showing us what the life of a shantyboater was like.

It was Harlan, though, who gave us the only decent definition of what a shantyboat is. He says, "A shantyboat is a scow with a small house on it. Nearly always a homemade job, it is put together of odd shapes of odd scraps of material and pieces of driftwood and wreckage. The shantyboat may be embellished with any of the appurtenances of living. Yet it is more than a floating homestead, it is an ark which the river bears to a warmer climate, better fishing grounds and more plentiful and easier work on shore" (page 2).

The Hubbards knew well that they were not true shantyboaters, but their observations of the shantyboaters of their acquaintance among whom they lived and worked give us a picture of a way of how "Messing Around in Shantyboats" was done at the end of the shantyboat era that can never be equaled. It was a unique, we would say today, "life style" that was dying out even then, and has become all but extinct now, at least in the way the Hubbards saw it in the 1940's.

The Messing Around in Shantyboats Lifestyle

The "Messing About in Shantyboats" lifestyle the Hubbards emulated was anything but an easy or lazy one. Harlan admitted that he sometimes longed for the easier life of the dry land which required so much less effort on his and Anna's part. Yet there was something about what he came to call the "River Way of Life" that appealed to something very basic in his nature. In the very first sentence of his book he tells us that, "... the river tugs at whatever is within reach, trying to set it afloat and carry it downstream." By what is "within reach" he means not only driftwood or flotsam and jetsam cast on the riverbank, but also the hearts and spirits of us river lovers who long to launch themselves upon it in anticipation of the new lands, new dangers, new waters and new experiences it will carry us toward. But messing around in shantyboats is much more than just drifting along with the current. It involves the very real and hard work of making a living as you go.

Working at Shantyboating

Harlan tells about many of the ways the shantyboaters kept body and soul together as they went along by mostly plain, simple, hard work. Not one of them lived on so-called "public assistance" of any kind. Mostly they lived by fishing, hunting, gardening, boat building, laboring, odd jobs or just about anything else they could to make an honest buck. The important thing to understand is here that there were no lazy shiftless folks messing around in the shantyboats in Harlan's day. Yes, they were poor by most peoples standards of that day, or this. They had no electricity, no television, no radio, no fiberglass, stainless steel or, in short, none of the conveniences that most of us consider "necessary" today. Nor did they have to pay any taxes or rent or have a mortgage hanging around their neck or a fossil fuel

guzzling automobile to support.

Shantyboat Bread Making

A good example of this approach to life was the Hubbard's grinding their own flour by hand. Harlan found a discarded hand grinder in a dump, fixed it up and then whenever they needed it they would get some wheat and just grind as much flour they needed for fresh bread, rolls, muffins or what have you. I don't remember a single instance of their ever going out and buying a store bought loaf of bread. The other major food item in their diet was fish.

Shantyboat Underwater Livestock

Early on in their river odyssey some of their shantyboater friends taught Harlan how to catch fish. He became the very epitome of the old saying, "He who gives a man a fish has fed him for a day, but he who teaches a man to fish has fed him for a lifetime." Even the fishheads that most of us would have wasted were ground up by the Hubbards for dog food for their numerous dogs. I always have been very touched by the dogs returning the favor to their master and mistress by bringing home an occasional rabbit, raccoon, or other animal for the family larder. Natural foods were very much emphasized in their diet.

Shantyboater Veggies

Harlan and Anna made use of any of the natural food which the Lord has provided in His abundance for all of us. They frequently used something called "poke weed," which they found growing along a railroad right of way or a riverbank. They searched out old shantyboaters who guided them in their search for natural foods that came to provide a substantial portion of their diet.

They discovered, as many cruising couples do, that their health was never better when they were on a drift. They had no need to fear being overweight because the natural activity of their *Living Aboard Shantyboats* lifestyle kept them always trim and fit. Both of them lived happy and productive lifestyles well into their eighties.

The Shantyboat's Garden

Each spring the Hubbards would pause in their drifting someplace and plant a garden. Their gardens provided not only enough for their immediate needs but enough to can for the coming cold months and to barter for other things they needed. I know it will be of interest to some *Living Aboard* readers to know that they never used any chemical fertilizers. Their plow was a spade and they spent long hours laboring by the sweat of their brows in the good old fashioned way. The results truly, "... made their hearts glad."

Following an ancient shantyboater tradition, they gladly shared the fruits and vegetables from their garden with their neighbors, both the shantyboaters and the landbound farmers. There was always room at their table for anyone they came in contact with. They, in turn, frequently found the hospitality of other shantyboaters and land bound folk one of the pleasures of their "River Way of Life."

Shantyboater Gleaning

There are those who would criticize shantyboaters for what they wrongly consider to be "stealing" from their friends and neighbors. Actually nothing could be further from the truth. It is true that shantyboaters are inveterate collectors of what they would call "plunder." Plunder is simply anything that a shantyboater might find floating in the river or cast onto the riverbank. No worthy

shantyboat would be complete without its complement of nets, baitboxes, pieces of driftwood, old oars or what have you on her top or arranged artistically along her landing spot. Some might think their occasional harvesting of certain crops planted by others as unethical. Actually nothing could be further from the truth.

If, for instance, they found a walnut tree going to waste, perhaps to be inundated by the river at flood, they would simply harvest that which would otherwise have been lost to everyone. This follows the ancient Biblical tradition of "gleaning." In Leviticus it says, "And when ye reap the harvest of your land, thou shalt not wholly reap the corners of thy field, neither shalt thou gather the gleanings of thy harvest. And thou shalt not glean thy vineyard, neither shalt thou gather every grape of thy vineyard; thou shalt leave them for the poor and stranger: I am the Lord your God." (Leviticus 19:9,10 KJV) The shantyboater tradition that says the first two rows of crops along the riverbank belong to the shantyboater is just a variation of this ancient ethical law. The farmers along the river accept this dictum, for they know no true shantyboater would ever take advantage of the law of gleaning by taking more than the shantyboaters' tradition allowed. They found most farmers to be deeply religious people who understood our Lord's teaching of feeding the hungry.

The Bargain of Bartering

In many cases they bartered for their simple needs. They discovered that many of the farmers that lived on the very banks of the river never fished. So whenever they had extra fish and to spare, they would barter some of their fish for farm fresh milk, eggs, butter and other farm produce. It was the quintessential bartering relation by which each party receives the best part of the bargain.

It would be a most unusual shantyboater who had all the money they needed to buy even the basic necessities of life. Bartering is an essential way of life for them. The first thing a shantyboater would ask after meeting another would not be, "What port do you hail from?" but "Do you have anything to trade?"

The Shantyboat Renaissance

I suspect that many of the readers of *Messing About in Boats* might be finding that I have struck a resonant chord in their spirits. I know that when I, after many years of reading "cruising" books and magazines, discovered shantyboating I felt I had finally come home. I have never had any serious desire to build a Tahiti ketch and take off for Paradise a la South Seas style. I have never had any real desire to zoom around towing water skiers in a boat that looks like the inside of my refrigerator turned inside out and flattened and made of what L. Francis Herreshoff called, "Frozen Snot." (One summer's "fun" towing my kids around on water skis was quite enough of that!) What did attract me in my *Living Aboard* perpetual lifestyle after I got through the building and re-building of sailing canoes and skiffs was houseboating.

The first chance I got, about ten years ago, I bought a 30' Drift-R-Cruise houseboat over near Atlantic City, re-built it and brought it around to my dock behind City Hall in Millville, New Jersey. This kept me for happy for a few years but I found all too many people who asked me, "How fast will she go?" I really got tired of explaining that houseboating was a relaxed lifestyle that really didn't re-

quire going very fast. I even found myself looking covetously at the kind of so-called "houseboat" that sells for "only" \$495,995.95, looks like a house trailer and the salesman claims can go 35 knots. When this happened I knew I had to do something because I knew, instinctively, that there had to be more to a real *Living Aboard* lifestyle than that. I still loved my homemade, 26' Luger, "Windjammer" cruising sailboat, my 16' homemade sailing canoe, my Penguin class sailing dinghy and my 92' floating dock on the Maurice River in Millville, but still I knew that there had to be something beyond them that my *Living Aboard* spirit longed for.

Then, just at the right moment, I picked up a copy of Russell Conder's *Handmade Houseboats — Independent Living Afloat* (Camden, Maine: International Marine, 1992) and the shantyboat light shined. There it was on page 222, the picture of a little 18' x 7' houseboat called, *Retreat*, designed by William Atkin and I knew instantly that this was what I had been looking for for many, many, years! This little quote by Roger Taylor really turned me on, "About the cheapest way to live afloat is a small houseboat or 'shantyboat deluxe' as designer William Atkins called his creation *Retreat*. In 1944 he said this 18-footer could be built for \$200." That's when I really got excited! I realized it would cost more than that to make it today but, I asked myself, wow much more?



The Design of Serenity — The Slowest Boat Afloat

I got out my magnifying glass and looked at the dimensions of the *Retreat* on the plan. Why, I asked myself why could we not make the entire design modular (divisible by four) and have a design in which there was virtually no waste at all and standard lumberyard construction grade plywood would be used in the construction. Why not indeed!

One thought led to another and the first thing I knew the plan for building the first *Serenity — The Slowest Boat Afloat* leaped almost full grown into my mind. It was the culmination of a lifetime of dreaming and scheming for the perfect boat. I put my computer to work and the first thing I knew I came up with a 8' x 20' "deluxe shantyboat" that could be made in as little as 60) hours or less by two people (basic construction only) with four basic hand tools (drill, saw, hammer and square) for about \$1,200. The cabin would be 8' x 13' with 6' and 6 1/2' headroom.

Cutting the Cutting

Once I got started, the most amazing ideas began to occur to me. For instance, I came up with a simple and easy way by which all of the planking for the topsides of the hull could be cut with just four straight and simple saw cuts. There were similar ways to quickly mass produce other parts of the hull and cabin.

It was the same with the construction of the two sets of steps for entry down into the cabin. I came up with an easy way to make them from one 10' 2x6. The motor mount like-

wise was made of one 10' 2x8 instead of spending many hundreds of dollars for one labeled "marine." I even figured out how to make two folding masts for the sail rig out of a few 2x4's. The sails themselves have been designed as sprit rigs with a 2x2 spritpole and material, the cheapest and strongest available, cut from ordinary tarpaulin material. I have even discovered that this material can be very satisfactorily "sewed" with an electric glue gun.

Building Shantyboat Style

In order to do all these things as efficiently and economically as I did, I had to decontaminate and purify my mind from all the myths and erroneous ideas that had been brainwashed into my head for most of my adult life. I had to rid myself of the idea that "marine" plywood was better to make a shantyboat with because it was "better."

I had to find out, for instance, that as long as you don't bend plywood there is no reason in the world for spending \$48 for a sheet of "marine" plywood when you could do just as well with a \$12 sheet of construction grade plywood from your friendly neighborhood lumber yard.

Likewise, the idea that I had to have "stainless steel" this and "stainless steel" that had to be purged from my thinking apparatus so I could begin thinking like a shantyboater and buy a \$5.95 galvanized cleat that would do same job for just as long as the \$50 stainless steel one.

Like a true shantyboater, I had to discover that I could save hundreds of dollars by using \$22 basement casements for windows rather than bronze portholes you couldn't see through. And so it went through many stages until at last my *Serenity — The Slowest Boat Afloat* was there floating in the water at the Fowser Avenue ramp on the Maurice River.

As you can see, simplicity is the name of my minimalist game.



Yes! — You Could Do Better!

One of my clever strategies in making my *Serenity* was to have everybody look at the messy joints, paint job and cheap-o finish in general and say to themselves, "I could do better than that!" The truth is that most of them actually could! Even someone who had never built as much as a birdhouse before can make a *Serenity — The Slowest Boat Afloat*. You don't even have to be able to hammer a nail because there are simply no nails in *Serenity — The Slowest Boat Afloat*.

The Four Tool Team

My minimalist approach to shantyboat building even extended to the tools used. All that is really needed to make an *Serenity — The Slowest Boat Afloat* are: a circular saw; a 3/8" drill; a carpenter's square; and a hammer.

Most or all of these can be purchased at a discount or borrowed from a friendly neighbor. And if it is necessary it is even possible,

surprisingly quickly, to make a *Serenity — The Slowest Boat Afloat* with non-electric tools. However, I must warn you that despite how easy one screw can be driven with a Brace-and-bit and a #2 Phillips hand bit, driving several hundred of them can get to be a bit tedious! Hand sawing through 16 feet and more of 1-1/2" plywood does not take a lot of skill, but the old biceps is almost certain to feel the strain.

High Tech Minimalism

This is not to say that I ignored all the wonderful new materials and labor-saving devices that are on the market nowadays. I studiously, however, avoided some of the newer boat building materials and techniques that require the use of epoxy stitch and glue, kevlar, heat shrunk dacron, C-flex, aluminum, stainless steel, cold, molded, laminated, Baltek Durakore, you name it or any other material that could not be bought at a convenient lumber yard or building supply center.

I also studiously avoided anything with the label "marine" as I have learned that paying four or five times the hardware store price of a screw didn't make it hold any better or last any longer. Good old fashioned galvanized fittings and fasteners were good enough from my grandpappy and are plenty good enough for me, especially as there are very few exposed screwheads in the construction of *Serenity — The Slowest Boat Afloat*.

Plywood Particulars

The same is true of plywood. After reading the leading exponents of plywood boat buildings, I discovered that exactly the same waterproof glue is used in ordinary lumberyard plywood as is used in "marine" grade. The only difference, if indeed there is one, is in the number of plies and possibly fewer "voids" in side the wood.

All the worry about ordinary plywood used in boatbuilding delaminating at the edges is easily avoided by simply having no exposed plywood edges exposed on the exterior of the entire boat. Even if this is not done properly, sealing, painting and preparation of plywood edge exposed to the elements will greatly eliminate this problem.

In my very un-humble opinion the 400% increase in the cost of marine plywood over the cost of the very serviceable regular construction grade stuff is hardly worth the cost.

About 25 sheets of 1/2" plywood are used in the construction of an *Serenity — The Slowest Boat Afloat*. Most of the plywood used in the construction of the cabin can be ordinary "construction" grade which can be had in some localities for as little as \$12 a sheet. It may not be very pretty but it does the job just fine.

Since the *Serenity — The Slowest Boat Afloat* is built on modular (4' dimension construction dimensions) there is very little waste.

The Magic Screws

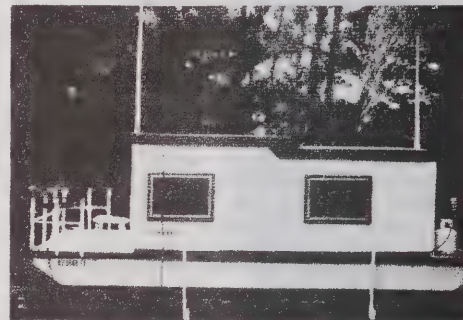
The only high tech material used in a *Serenity — The Slowest Boat Afloat* is what I call the "magic screw," commonly known as the dry wall screw. I'll never forget that enchanted moment when I put that #2 Phillips head bit in my drill and drove my first wondrous dry wall screw. Z-I-P!! There it was in the wood practically instantaneously, and it even counterset its own head without the benefit of a pilot hole. Magic to one who had blistered his palm many a time with the old type of screwdriver.

In addition I discovered that there are only two sizes of dry wall screws used in the

Serenity — The Slowest Boat Afloat. It is true that the longer size requires a simple pilot hole, but they go in just as easily and quickly as the shorter variety.

Cabin Embellishment

Once you have the shantyboat minimalist concept firmly in mind the principle can be applied to any other part of the boat you're messing around with. In *Serenity — The Slowest Boat Afloat* for instance, almost the entire 8'x13' cabin (With 6' and 6-1/2' headroom) has been furnished with houseboat hold furnishings at a fraction of the cost of things purchased in the marine store. In the *Serenity — The Slowest Boat Afloat* prototype, for instance, the following materials were either found in the family attic, purchased second-hand or simply picked out of some wastrel family's trash.



The list includes wall-to-wall carpeting, six cabinets, antique medicine cabinet, large wall mirror, a microwave, bi-level table, five decorative plaques, a full setting of dishes, glassware, flatware and kitchen utensils, two table lamps, wooden adjustable floor lamp, two sleeping bags and sheets, a clothing rack and a variety of jackets, shirts and miscellaneous clothing, occasional table, steel tool box, three steel folding chairs, four-slice toaster, toaster grill, futon bed and mattress, silver salver and teapot (without lid, but who needs one), three wall lamps, 18 books, good pack frame, 20" bicycle, 16" machete, five pillows, three wool blankets, overhead hatch, 25-gallon water tank, two-burner propane stove, student size electric refrigerator, two propane tanks, complete galley including faucets, curtains on six windows, numerous storage boxes, fishing and crabbing equipment, and on and on and on.

Basically for a few hundred dollars I have collected everything needed for comfortably messing around in boats as a live-aboard. The entire cost for a fully functioning messing about aboard *Serenity — The Slowest Boat Afloat* was only a couple of hundred dollars. Yes, by buying new cabinets and equipment I could have spent several thousand dollars quite easily. Then I would have had the additional expense of having these items professionally installed as well. You can't tell me I will sleep any more comfy on my \$80 futon bed or prepare a more nutritious meal on my \$30 (a Christmas gift) propane stove with the dishes washed in my \$35 galley than if I had invested many times their cost for Beauty Rest mattresses and "marine" galley stoves and the like.

Yes, it is not a lifestyle for everybody. But my main point in telling you how I have done it is to convince you that you don't have to do it my way. I want to convince you that you could do it any way you want. You can spend all the money you want, or as little. You



can make things look the way you want them to. In short, if you don't want to be a minimalist messing around in boats like me, you don't have to. You can do it, to paraphrase Old Blue Eyes, "your way." The important thing is for you to stop talking about doing it, get four simple hand tools, 25 sheets of plywood, a few 2x4's, 2x6's and 2x8's and make your own version of *Serenity* — *The Slowest Boat Afloat* and your own healthy and satisfying lifestyle.

It's all up to you. What do you want to do with the rest of your life? You too can be a shantyboater. Why not?

I have received so many inquiries from all around the country about the *Serenity* that I have gone into hyperdrive in finishing up my book of instructions called, "*Build Serenity! — the Slowest Boat Afloat!!*" and many of my respondents have urged me to issue a pre-publication offer.

This mighty labor of love was somewhat delayed by what the pill pushers call "a cardiac episode" that required an extended rehabilitation period "Living Aboard" on the Potomac River and the Chesapeake Bay. The good news is that I am now close enough to the final publication date to be able to offer *Build Serenity* to a select group of *Living Aboard* readers who don't want to be limited to messing around in boats for just a few day but would like to spend months, years, or even a lifetime living essentially tax and rent free in a shantyboat of their very own.

Every would be shantyboater will receive the following in return for his/her \$29.95.

1. Every copy of *Serenity!...the Slowest Boat Afloat!!* will be personally autographed by the author with a personal message.

2. The \$4.95 S&H costs will be paid by the head Skyliner himself, that's me!

3. His/her name will be printed on a special page in the book.

4. He/she will be eligible to receive a free subscription to the *Serenity Builder Newsletter*.

5. He/she will be put in touch with professionals if she/he does not want to build the boat him/herself.

6. He/she will be eligible to purchase a copy of *Build Serenity...the Video*, at a special discount (when available).

7. This shantyboater's eternal gratitude.

But more important than any of these things will be their opportunity to develop a lifestyle that will enable them to develop some of that most precious of all lifestyles, — one characterized by *Serenity*!

I would most interested in hearing from anyone who would be interested in knowing more about my *Serenity*, which I sincerely hope will become theirs as well.

All that is required is for any *Serenity* seeker to make a decision to "do it" that will change her/his entire life.



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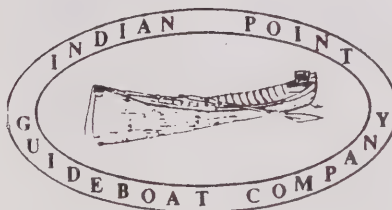
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"The Old Ed Stories"

By Eric Russell



"Late 'Cap'n' Latham Jennings Was One of Few New Bedford Boatsteerers to Feel a Live Whale Beneath Him"

(As published in The Evening Standard, New Bedford, Massachusetts, Thursday, December 31, 1916)

By David M. Cheney

There was an old Marion whaling captain once who liked too well his rum. And when he had drank himself "two sheets in the wind," as they say in Marion, he was a merry fellow! The gossips of Marion still tell of the high spirits he was in on a long v'yage, when whales were spouting all around and he had a little cargo of his own aboard. He is said to have been in such a joyous mood that he sprang from the boat when they were fast to a whale and danced upon the leviathan's back.

There have been few whalemens, in truth, who have ever felt a live whale's back under them, and one is the Captain 'Lafe' Jennings of 360 Ash Street, one of the greatest of New Bedford's boatsteerers. He passed away this month.

'Captain' was merely a complimentary title for Mr. Jennings. He was given it after he left the sea because of his record as boatsteerer for the ship *Reindeer*, Captain E. R. Ashley, which sailed on October 15, 1856 and returned March 24, 1860. It was claimed further by those of her crew who survive that she brought into New Bedford the largest and richest cargo of oil ever broke out of hatches. Eight thousand barrels, Captain Jennings said she had, and the net proceeds of oil and bone were \$335,000. The captain's share of this wealth was \$35,000 and the two mates received \$20,000 each. The ship *Onward*, sister ship to the *Reindeer* but smaller by ten tons, always claimed to have brought in the largest and richest catch, a catch valued at \$325,000.

The *Reindeer* was built at Mattapoisett by Josiah Holmes. Edward W. Howland of New Bedford was her agent. She sailed on her first voyage in October, 1853 and arrived home in February 1856. In her 28 months' absence, under command of Peter Cromwell of Martha's Vineyard, she came home full with 2,800 barrels. Her next trip was under com-

mand of Captain Ashley of *Acushnet*.

Latham T. Jennings was born on Hathaway Road on August 29, 1838. His mother, Abbie Wanton Jennings, was granddaughter of old Governor John Wanton of Rhode Island. Captain 'Lafe' left school at 11 to help his father, who was a stone mason, take up Taber's wharf. He worked with his father building the George Howland and Merrill's wharves. After farming for a time in Lakeville, he went to the Point Road in 1853 and was employed by Potter & King to help build French Avenue. Three years later he went to sea with Captain Ashley of the *Reindeer*.

Captain Jennings went to sea on the *Reindeer* again when she sailed under command of Captain George V. Ray, late of Sag Harbor, on October 2, 1860. For fifteen months on this two-year voyage he steered a boat. The first mate was William T. Kelley. Captain Kelley was the son of the ship's carpenter of the old frigate *Constitution*, and at sea it was a favorite diversion to hear 'Ed' Kelley repeat the stories his father told him when a boy of the battles in which the old frigate took part and how they stopped up the shot holes.

'Lafe' Jennings was a brawny boatsteerer. A more successful one never stood up in a boat's head to throw an iron into a whale. To his officer, the son of the *Constitution's* carpenter, he had always one request to make before they gave chase to a whale, "You can never get me too near. I can get them better wood and backskin than two darts away."

And Mate Kelley more than once drove them upon the whale, "wood and backskin" as directed. As for stove boats, it was a common thing, especially when 'devil fishing' off the California coast.

The "California gray" or devil fish, is the most savage of the whole family leviathan. He is a huge, vindictive beast with all the fight of Herman Melville's *Moby Dick* in him. While in Magdalena Bay, one devil fish drove ashore 35 boats while the *Reindeer* was there, another struck the boat in which Jennings was boatsteerer three times, smashing her and tossing her crew into the sea. One man who could not swim, was long in coming up. When he did so, blood was coming from his ears and nose.

"Jennings, did you see my hat?" said he. The hat was a Mexican grass one, which are bought for about "two cents a dozen" as Captain 'Lafe' put it.

But Captain 'Lafe' has told his own story. He lounged back by the famous sheet-iron stove in Brown's gun shop. The other old-time whalemens listened, thinking of their own exploits at sea.

"They gave me the 68th lay and to steer a boat," said he. "We are all on board. The

anchor hove short and now it's to the hawse pipe, and God bless you all, with hats in hand. We are off on the v'yage with seven other ships and barks that sailed that day and none in sight the next morning.

"Had light winds by the Western Islands and down to the Cape de Verde, and then for Cape Horn. We left the 1,200-ton ship *War Hawk* and ship *Siren* of Boston bound for the Sandwich Islands after oil. Down by the Patagonian shore we had a heavy gale for three days. We saw natives on the beach. It was off Cape Horn on January 1, 1861 that William Stowell, a Vermont marble cutter and a green hand, fell from aloft. He struck on his head and died at once. He cleared me as he fell by only three feet. The burial was on a Sunday morning and some of the crew of the bark *Vigilant*, homeward bound, came aboard during the services, and by them we sent letters home.

"We went up the coast of Chili. Off this shore we come into a strip of green water and found right whales there. Lowered, and in a snow squall lost our mast and sail. We went back on board at dark. Had quarter watches. At 3 a.m., got after them again and chased until 11 a.m. with no luck. Went aboard, got some grub, lowered again. Went into a gem of four, hooked the largest one, got stove, whale's tail hit us. The tub-oarsman, Frank Stowell, got dazed a bit. Soon had the whale dead and went to cutting in the next morning.

"The first officer went down after more and got one. In the afternoon we got another. Cut until 9 o'clock and then got some sleep. In the morning after eating we finished cutting what was left.

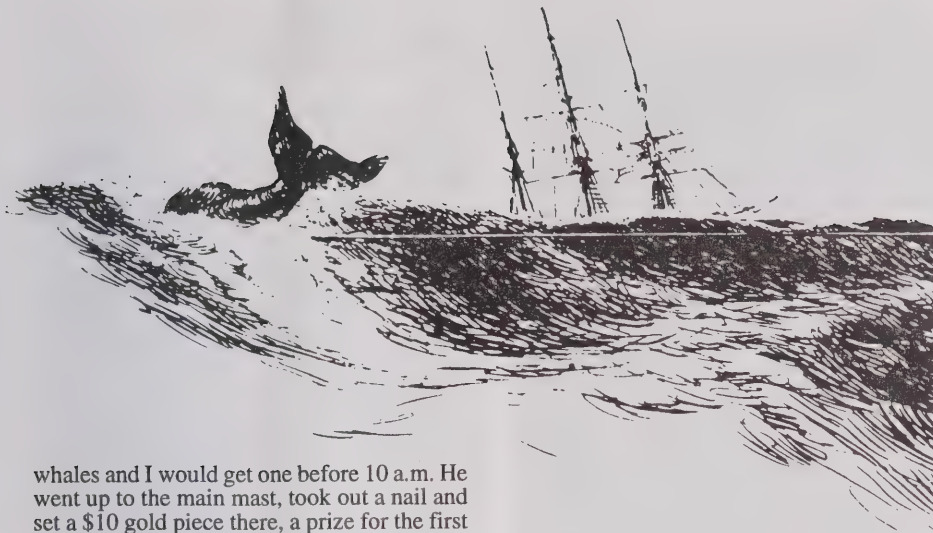
"The mate lowered and run off to leeward. We went down in the captain's boat. The first mate struck on a mile off and we lay on the starboard bow and soon a large one came up rolling and tumbling, and off we went for him. He was on his back, his fins and tail out. Our boat had a fake-keel, 18 feet long and 9 inches deep. The boat struck on his belly and he let rip and cut the steering oar. Was knocked off and the whale went down.

"I had changed ends of the boat, but our line kept on the move. 'Don't slack any line,' I said soon, 'there is something afool of our line,' and looked and the mate's boat was loose. Up came two whales. The mate's was shot with a bomb lance and ours was dead with the irons, and now the fun begins. The mate left his whale with us and we took both whales to the ship. I got a new hat from the captain and from the mate one quarter box of tobacco, or 32 pounds. I gave the tobacco to the two boats' crews, four pounds apiece in each boat.

"The old *Europa* came to us. She had been on the New Zealand grounds. She got no whales while we were there.

"We left her and went on north. The captain threw me his hat, we had caught five whales in three days and stowed down 512 barrels. Then we went up the coast of Chili and the next Sunday we raised a large sperm whale. Went down and got it. It looked good, spouting 41 times before we got to it. It stowed down 100 barrels.

"Now we were off for the Sandwich Islands. The next Saturday I come on deck and went for orders. The other boatsteerer was aloft on the lookout. The officer told me to get the ship's keeper and set up the mizzen topmast rigging. I told him I had been home driving horses. The captain came up to hear what was said, and I told him we would see sperm



whales and I would get one before 10 a.m. He went up to the main mast, took out a nail and set a \$10 gold piece there, a prize for the first to shout "There she blows!"

"We set the port rigging up and got tackle on the starboard side, got the mast up plumb. Looked astern and saw two large sperm whales and sang out for them. The mate lowered and went to the leeward and we out astern of the ship. I had only seen the two. Got my officer going right. He soon found out where they were, for soon they came, head and head.

"The breeze was good. As we neared them they milled around. Going as we were, I motioned to the officer to give me a right-handed dart. I got the word and got myself in shape for the chance. We got there all right and I threw my irons into him. He never moved. I threw my box work overboard, took care of my mast and sail and looked over the head of the boat.

"The whale was most out of the water. 'Stern boys! He is coming up!' I cried, and up he came. He snapped his jaws, I had never seen a whale do it before. He struck them together three times as quick as you could throw your arms open and shut, and the noise could be heard half a mile away. And if there was one hair on my head that did not raise on end, it was for the reason that it had no roots.

"The box warp lay on the water, and he on the way up and under the boat. "Stern, boys," I shouted again and caught the bomb gun.

"His head came out 18 or 20 feet. I was ready for him and as he went down, I shot the bomb lance under his fin. And then I gave the crew the word to take the oars and get out of the way.

"But there could have been no harm done by that whale, he was dead. They did not know on board the ship we were fast until he was dead. I got a new hat. When we got alongside with the whale, he stowed down 110 barrels.

"We ran our fresh water out of the casks by cutting the casks bung down and then running in oil, so did not take the casks out. We found no fresh water left in them, but some in the water tank. So off we went for Honolulu.

"Arrived there and shipped home the whale oil and bone and were off for the Arctic. Made Behring and Cape Islands. Got five barrels of codfish.

"It came a heavy gale and snow that stayed with us three days, and a bad blow it was. The oil began to leak and we had to take it all out and cooper it. Lost 100 barrels.

"Now we got up to the ice by Cape Navarin. Heavy ice. We spent three days here

and then sailed south in a thick fog and north again.

"Raised a bowhead at 3 a.m. Called all hands, lowered four boats. The whale came up, a large one. The captain says, 'Get one here, it will be a big one.' So we crawled up to him and it looked as if he would stay up long enough.

"I fixed myself and took my iron. I looked at my officer and then at the whale. He was going and we were gaining on him. I hung to my iron as long as I could for his tail was coming out of the water. I put all the strength I had into the throw and let go, and it struck his small and overboard I went.

"The captain came and took me on board and left his boatsteerer in my boat. I got on my dry clothes and some hot coffee and a bite to eat. When I went on deck I found them getting ready to pull him up, dead and on the bottom. He was on the bottom in the deep hole and both tubs of my line were out. The mate had the turn of the capstan and some were hauling on the line. When the ship rolled to starboard, we go in the slack and the mate held. For some time there was no change. Soon I, uneasy, ran aft to see what was doing. The tow line was very small. The mate says, 'Jennings, you lucky boy, you will get him.'

"I ran forward and the captain says, 'Jennings, you will lose him. You will pull the iron.'

"I said, 'No sir, you can't, for I saw the head of the iron through his small, before I struck the water and it is toggled.' I said the mate told me we had 150 fathom of line out.

"When the whale came to the surface he floated light as a cork. Just think how I felt when that fluke chain was on him! That made me six large whales out of eight, and all well earned.

"When the captain stopped in the gangway and said, 'Jennings, he is good for 175 barrels,' I asked the boys if they had anything to say for poor me, and they gave me three cheers. I thanked them and they gave my officer the same, being led by the captain.

"That time, all that wanted rum got it. The boys worked hard to get him. The captain gave me a good overcoat. If my iron had been in the middle of the whale we could not have got him. He would have started harder.

"I speak of this to show how easy it is to lose them or to get them. I will speak more of my boat header. I will say he never ordered

me when to use my irons, for the reason more whales are lost or missed this way than any other.

"He says, 'You may use your brains, (which I always did) for you will be 20 feet nearer the whale than I, so I began to feel out some of them.'

"I never went for one that I did not get hold of, but don't think that I never went overboard, for I have been there often. It made me bolder afterwards. I did not want to be laughed at by him many times, and I was not, for 18 times lowering our boats we never missed taking oil. That is some reward!

After taking that whale, we got up to the ice and saw some ships, but gemmed none of them. We entered the straits. Four ships lay there on the lookout for whales. They were the large ones going up into the Arctic, and larger than those that came later.

"Now at this time, it was pleasant and some natives were there trading with the ships. Some came on board of the *Reindeer*, having ivory to trade and wanting in exchange new carpenter's tools. One old fellow did not want rum, he liked the tools, so he went into the cabin and stole a flat file and dropped it down his neck inside his fur. He was sent on deck by the captain, and as he went by grabbed the captain's shoulder and tore out the cloth to his skin.

"The rest of them were on deck, men, women and babies. Some order was given and the deck was cleared of women and cubs (who were all in furs) and then they came for us with knives. We had to protect ourselves and did so, killing two or three and putting them in their boats. They had been drinking hard aboard the other ships and were wild. Some were giant fellows, but we got clear of them, however, and in shore they went and on up the straits.

"We went the next morning. We were up off Saint Lawrence Bay where the ship *Coral* wintered. She was 10 miles in the bay, ice four feet thick around her. We sent her some vegetables on a sled with dogs. The same natives that were aboard of us were about the *Coral*. They had gone in that time 60 miles.

"We went on up to Indian point, got a large whale, cut it in and gave the carcass to the Indians, they had tons of good meat.

"We went on up to Port Clarence for wood but got none because of a fog that lasted for three days. Came back to the Siberia shore, east cape. Got three whales there. Then to the Alaska shore where we got one near Cape Lisbon and two off ice cape, then out into the open Arctic.

"Found a polar bear on the ice eating cubs. Went for him with two boats. He dropped off the ice and was quite busy watching us, but the mate got his attention by pushing a lance through him. Then trouble began.

"The bear knocked that lance out of him and was off, swimming as fast as four oars could pull the boat. And now it was our time. He stopped and showed fight with the mate. The second mate took out the lance and run in a four ounce lead ball, gave me orders to go straight for his head and, as we neared him, he had two boats to look to. I kept the boat going for his head.

"He was sitting up in the water, his fore feet out of water. He looked first at one boat and then at the other. We had not troubled him yet and it looked as though he would be in the boat with us. As he turned his head from the

mate's boat, I could see no room for him to move around. The mate put the gun up to his head and fired the ball in under his left ear.

"He was dead as soon as it struck him. Took him to the ship. He weighed 1700 pounds. We skinned him and the captain gave us the oil. We sold it in Honolulu for \$1.00 a pint, 17 gallons. Lost the spine.

"We ate some of his liver and it made us sick. I had for my part his little toe nails, three inches long and 2-1/2 inches through.

"Worked north and filled up. Left the Arctic on September 2 bound for the Sandwich Islands to recruit our ship, get our liberty and try our luck without fur, for there are plenty of whales south for the old *Reindeer*.

"Now we have sent our oil and bone home. The captain wanted to go down to Booker Bay, South Pacific Ocean, but as he did not care much, the first and second officers wanted to go to the coast of California and would take him 500 barrels worth with each boat. He decided to go there. They had been there twice before. At that time, ships had just begun to catch the California gray whales. We who had been there wanted to go again. I had been there twice in the same ship with Captain E.R. Ashley.

"Now we are off for Magdalena Bay, coast of California, the place where our warships stopped in their trip around the world. Not many whalemens wanted to go for those whales. Magdalena bay is the best bay I was ever in. As we sailed away from Honolulu, we took all but three men of those with whom we left home, the cooper and shipkeeper and the one who fell from aloft and died.

"Now we go out of as good and safe a harbor as there is in the world. Around the island we went and up the north side. The captain left his medicine and sent a boat to have a native go across the island and get it.

"While the man was gone we tried our luck by lowering for fin-back whales. After trying for some time I caught hold of one going under the head of the boat. Three other boats were by, but not for long. He ran in shore among the rocks and then it was turn around or break his neck. When he came up to breathe, he would do so only once at a time and when we got after him, he didn't slack his speed any but ran faster, and when the iron broke apart, the water was running one foot higher than the side of the boat. That was the first one like him I ever had an iron in. We saved our credit by the iron pulling in two.

"Now on we go with a headwind and 15 days getting up there. Found no whales in the bay when we got there. Cut our wood, got it to the beach so as to have it handy when the season was over.

"The ship lay up in the northeast part of the bay that was called 'Man-of- War-Bay.' In came the war ship *Narragansett*, stationed there. Got our wood, tripped our anchor and headed for Lea Bay.

"We started slowly, drifting along. Now we had four iron poles made on the passage over to the coast. Each boat had one 7 feet 2 inches long and 3/4 inches through. With an iron in the end of it you can see how it looked, ten feet long in a good man's hand. With such a lance, if he is not of the right kind of stuff, he won't do much good in the boat.

"As we were drifting along, up came two humpback whales and all ready for them. We lowered the first and second mates' boats. These were the two boats that caught all the

whales got in the bay.

"The war vessel was coming in the passage at the time. She had been out to get her mail from the Panama steamer. The whales came up and we went for them. We went down and into their suds. He skimmed under the rim of the water and I sent that iron and it fetched up and off we went.

"The third boat came down and got clear of the ship and laid on its oars out ahead of us, and as the whale got to the boat he rolled over with his fin out of the water and cut the boat in halves.

"On we went up to the sand flats. The war vessel was on its way up there. The whale swung back to the passage. The war vessel stopped its engine. The whale broke water, got the lance and went into its flurry by the vessel. They called us alongside and we handed up some irons and a lance and the officer lowered us a side of beef and some sweet potatoes. We parted and saw them no more.

"We went on down into Lea Bay and put in our season there, after going by Pellicon Point, crossed the bay and anchored.

"There were no ships but the *Reindeer* in the bay and in the short time of five weeks we had 1336 barrels of oil below hatches. We fastened to 57 whales and cut in 40, all in two boats. The whales came soon and our work began, getting two cow whales the first morning, and never cooled the fires down until the season was over.

"Now about catching. We went into a place of about six acres called the Mudhole. We entered through a deep channel with a sandbar on each side of it in the early morning. We picked up the wake and stole upon the whale, which had her calf with her. You can sometimes get an iron into a cow whale with a calf. If she sees you, you will have a good long job ahead. If you should hurt the calf, then the cow will look after you and sometimes in haste.

"I was in the bay when 35 whaleboats were driven ashore by one maddened gray. I don't think we would have taken to the beach because of fear, for if you are afraid you can't catch that kind of whale.

"We sometimes took a whale every day. We would take a whale in the afternoon, it would be a bull and to the wind'ard of the ship and easy to tow. When dead, we cut a hole through its nose, rove in a line, took it to the loggerhead and pulled the nose out of the water and set our sail. The other boat would come and we would go off for the ship. If no other whales were in sight, we went to work on board for the rest of the day.

"When we whaled it for bulls, one boat kept to the wind'ard of the other and if the lee boat got fast, the other one would get it's warp into the fast boat and off we went. Soon we would get our irons into another, we got two and sometimes three or four would run together.

"One Sunday we went into the Mudhole. In it is a lagoon and a low tide there is plenty of fish and green turtle. We could get four or five barrels of fish in short order there. And mangrove bushes grow down to the water and oysters spawn on them, and that is where we got our oysters.

"We could get a boat load and tow off to the ship in one hour's time. There was scup, mackerel, catfish and Jew fish, the latter the largest scale fish, 2-1/2 feet long, 1-1/2 feet wide, weight 600 pounds. Plenty of lobsters

on the ocean shore, clams, shells of many kinds and I will not forget sharks, the largest I ever saw.

"One Sunday when we were getting oysters, a whale came up near us and ran itself out upon the sand beach. We killed her there and let the little calf go. It was about the size of a flour barrel and about nine or ten feet long. Sometimes they will go and hunt another mother.

"I have seen three calves with one whale. You chase them and the calf gets tired running. The whale will roll over on her side, take up the calf under her fin and run off a mile or more, drop the calf and let him suck, then he will be all right for a while.

"I struck one whale in the bay with five killers fighting it, eating around its mouth. It was in bad shape, but we had to take our chance. If it had kicked towards the boat not one of us would have lived. It would throw itself around every time it kicked and one killer was knocked two feet out of the water or more.

"We also got two whales that were asleep at the time we struck them. How do you think a sleeping whale breathes? He has to breathe when he sleeps, you think, but he must wake to do that, for his head is under water, back beyond his spout holes, with only his back out, his tail dropped. He resembles a large green turtle. The first one I struck did not realize anything until the irons woke him. It was the same with the other one. It was calm at the time.

"One day a fisherman came into the bay. He wanted grub and got it. He reported plenty of whales down to the passage at the end of the island. In a short time we were off for them, eight miles away. The wind was fair and before we got to them we could see very many spouts and the bottom of the bay full of lagoons, some 20 feet of water where the grass was out of the water.

"When we got in among the whales they were quiet, and we fastened to the first one, shot the next and the first mate struck one, and onto the sand beach they ran and out of the water as far as they could. We killed them on the beach and could not get them off.

"So we anchored them, then went to the ship and in the morning the captain went to see them and came back at night with anchors and irons. They were left there and we later had five whales alongside taken that day."

There were many other adventures on that memorable whale hunt. It was not until 1862, indeed, that Mr. Jennings finally turned his back upon the Acushnet River and the sea and, as if weary of plowing the sea-meadows, sank his plough into Bristol county turf.

And he was a farmer for years thereafter. He sank irons into between 90 and 100 whales during those vivid six years of hunting on the seas, and for one man, Edmund Kelley, he secured 45 whales on a single voyage. Few better records than this, if any, were ever made by a New Bedford boatsteerer. And it was a rare treat indeed to hear 'Cap'n Lafe' tell of it.

(Mr. Jennings has written down the story of his life adventures and they are now [1916] in the property of Frank W.H. Swift of this city [New Bedford].) N.B., Mr. Swift was then an antiques dealer.

My Kayak Trimaran

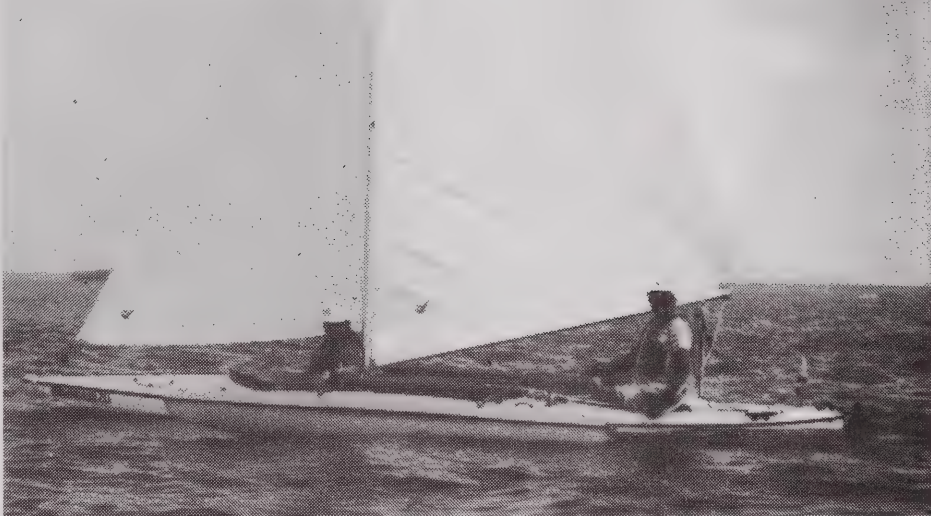
By Herb Telshaw

My yak is an Eddyline 20' 3-hole San Juan. When I bought her at a boat auction, she came with a Balough Design batwing sail (24 square feet) and while it would do OK in a stiff breeze, it was a total disappointment in light winds. So, like you, I decided to upgrade. Incidentally, your space problems are understood as mine grow from the limitations of condo life and working in one's parking bay leaves much to be desired, but it can be done.

Having made the decision, I proceeded via a seat of the pants approach and acquired a secondhand extruded aluminum mast 24' long. It had been involved in an accident of some ilk that had given it a pronounced fore/aft cant just above the gooseneck. I managed to salvage 19 feet of it that was straight and stepped on that a SS hinge atop the hold fitting supplied by Balough to accommodate a step on the hull bottom. This I supported with an internal compression tube because the basic structure of the yak is pretty flimsy at this point.

The task of providing akas and amas was resolved by acquiring two 10' polyethylene hulls plus aluminum tubes (1-1/2" OD) from a local manufacturer of wet bikes. Since these were designed to be coupled at a 42" spread, this became a critical measurement in locating where they would attach to the yak hull. With the forward aka fixed to the fitting holding the mast step, the rear aka ended up positioned just in front of my deck mounted compass. The issue of fixing the rear aka to the hull, while providing for the considerable loads certain to be generated by a quadrupled mains'l to guard against tearing the hull to shreds, was resolved by fashioning an internal 'round the hull' rib of 1-1/2" x 1/2" flat tubular steel. Hull penetrations, 28" apart, place the aka support pylons on the strongest portion of the hull. The pylons were fabricated from deck rail mounts, one 45 degree piece against the slope of the hull and topped by a 90 degree fitting placed upside down on top of the first piece, the whole being held together via a piece of 3/4 ss tubing. A long monel metal eye bolt through the internal rib and up through the pylon, with scope for passing through the aka with enough length to permit a screw-down fixture, completed the chore, and it has worked flawlessly to date, providing stiffness and support required in strong winds. Incidentally, in addition to pinning the front akas to the mast step platform (a chunk of 1/4" aluminum plate), they are supported by a twin tube fixture pinned into the slope of the hull on each side resulting in a three point pinning that provides both the vertical and lateral stiffness desired. The forward aka also serves as chain plates for the shrouds. However, these akas, being in the same vertical plane as the mast, made it necessary to include a backstay in the overall rigging plan. You can observe this arrangement in the photo.

Lateral plane for sailing is supplied via a long leeboard slung from the right front aka which can be rotated completely out of the water enabling me to slide right up on the beach. Also, the water bike manufacturer supplied hollow polyethylene platforms which can serve as a deck as well as either water or fuel tanks if you wish to cruise and/or add some form of propulsion beyond the paddle during



periods of calm. The modifications required for the latter are quite simple. I install two 12V marine batteries to power a trolling motor (which is slung from the rear aka using the crank housing of a bicycle with the motor attached to what was the bike's seat strut). This, too, can be rotated out of the water using a cable arrangement attached to the other single strut from the bike crank housing to the steering gear housing.

The backstay is anchored to a through-the-deck stub mast which also supports fittings to carry a large solar panel as well as a gimble supporting an aqua-generator cobbled from a 12V DC motor. The drogue is fashioned from a four-bladed fan and attached to the generator via several linked lengths of 3/16" fiberglass rod. This arrangement folds nicely for storage on the poop deck when not in use. My initial attempt using a ss wire cable was a failure, twisting into a magnificent knot!

The amas were located 70" centerline to centerline which made the craft just under 12 feet wide. To facilitate docking, I fabricated

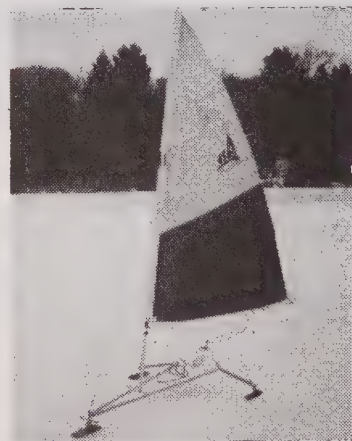
joints in the aka that permit swinging the amas forward and reducing the overall width to less than 6 feet. This works fine where you can handle the shrinking process while standing on the bottom. My deep water, from the cockpit solution, via blocks and cables, works OK but requires additional lines that have a negative impact on craft esthetics.

As mentioned, I've had a great deal of pleasure sailing this modified yak and I truly enjoyed messing about solving the challenges that attend most such endeavors. With 175 square feet of dacron, this lady really sizzles when the breeze gets to 10 knots and above!



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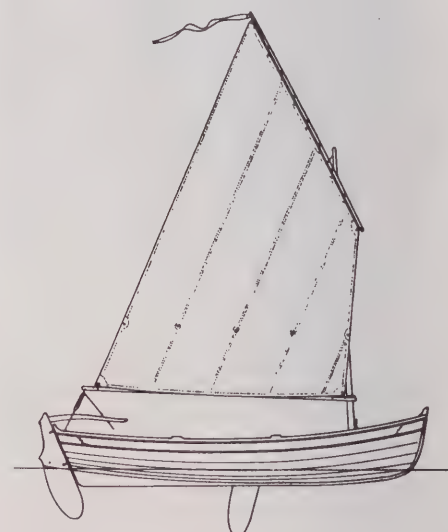
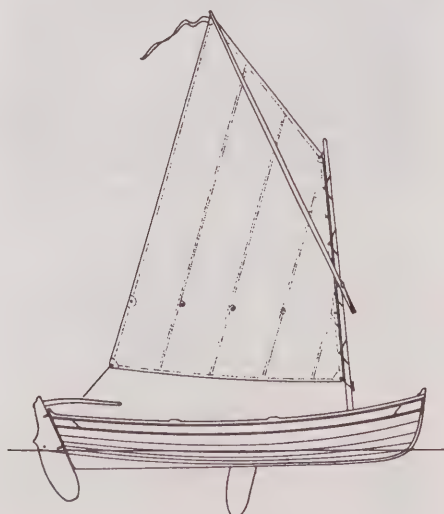
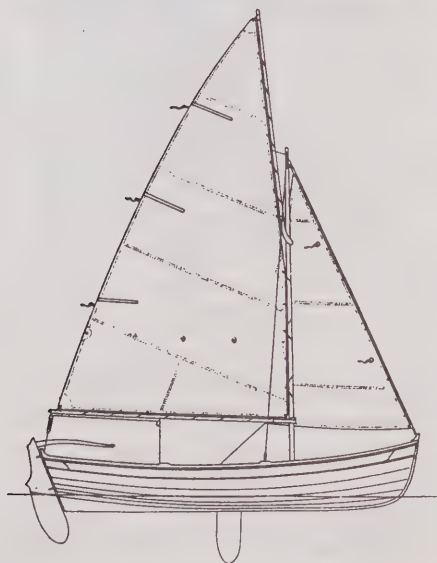
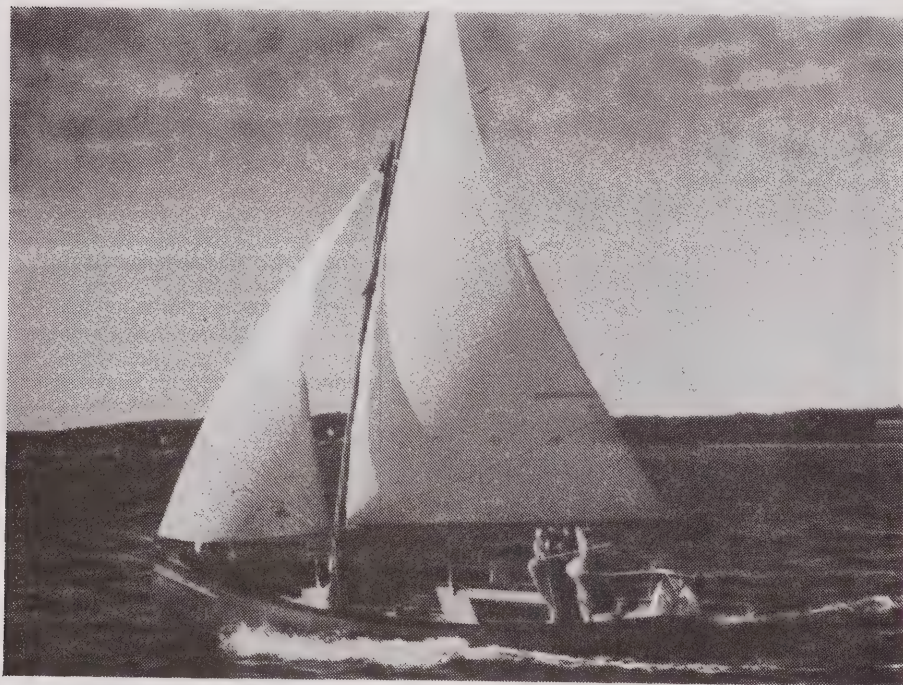




I found that the logic of the construction method and the sweetness of the lines of this boat made building her most enjoyable. She rows very nicely and her sailing performance and balance are all I could have hoped for. The admiring comments she draws wherever I take

her leave no doubt that her appearance also lives up to my fondest hopes.

A study package, plans and video are available from: Arch Davis Design, P.O. Box 119, Morrill, ME 04952; 207-342-4055. To place an order call 1-800-357-8091.



The Penobscot 14

By Arch Davis

My aim with this design is to offer the average backyard boatbuilder the opportunity to build the kind of boat that he has always admired, but probably thought beyond his skills. To do this I have modified glued lapstrake construction by making fore and aft stringers an integral part of the hull. This simple change has a number of advantages, and results in a building process that requires only the ordinary woodworking skills that you would need for a simple plywood skiff or dinghy. The shape of the planks is obtained by laying plywood planking stock on the hull in frame and scribing along the stringers. The planks are glued and screwed to the stringers. To get longer planks from eight foot sheets of plywood, the planks are scarfed together, on the hull, as they are laid up. I believe that all this is much easier, with fewer pitfalls for the less experienced builder, than other methods.

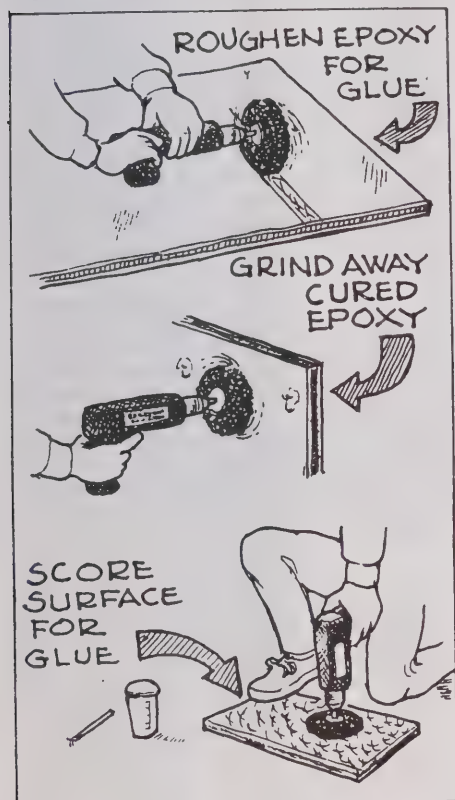
The stringers also confer structural advantages. They add stiffness and increase the faying surfaces at the plank laps (the Penobscot 14 needs no transverse framing at all). It is a simple matter to notch the stringers into bulkheads, allowing you to build watertight buoyancy compartments (an important safety feature of this design, seldom seen in boats of this type).

The refined and very attractive hull shape of the Penobscot 14 does not itself cause any difficulties in building. To further make the boat truly buildable by the average amateur, I have gone overboard to provide plans that are as complete and detailed as I could make them. The full size patterns are printed on mylar, which avoids problems with accuracy due to paper patterns expanding or contracting with changes in humidity. Being transparent also makes the mylar easier to use and, of course it is much stronger than paper and stands up well to the abuses of workshop use. The plans include an illustrated building manual which I hope leaves nothing to the less experienced imagination. There are drawings for three sailing rigs and optional centerboard or daggerboard. I have also made a video which shows the building process in detail. Kits and complete boats are available.

Building Paradox

Part 11

The Paint and Rust Stripper That Isn't: This is really a non-clogging, sander, grinder and all around surface scuffing tool. It's made by 3M and fits in your hand drill. Save yourself lots of sand paper. Use this tool in place of sand paper. See list below and illustration for some of the possible uses. You can use its flat surface or the outer edge.



1. It scuffs cured epoxy surfaces better and faster than any other tool, allowing the glue a good gripping surface.

2. Grinds away cured lumps of epoxy. Can even be used on uncured epoxy.

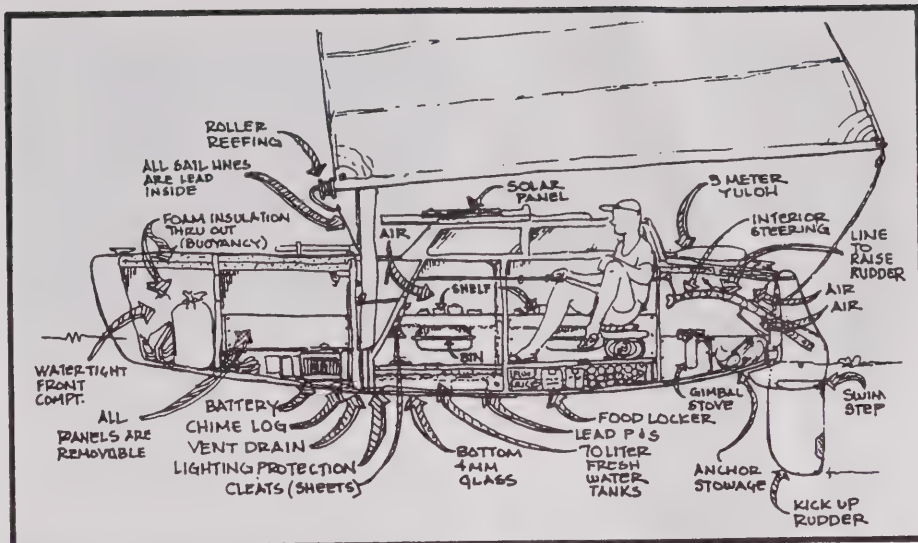
3. Scores plywood or wood surfaces for excellent gluing.

4. Scuffs bumpy epoxy surfaces that need fiberglass cloth or putty applied to them (like the woven roving surface on *Paradox's* bottom). No other tool can do this with the ease the stripper can.

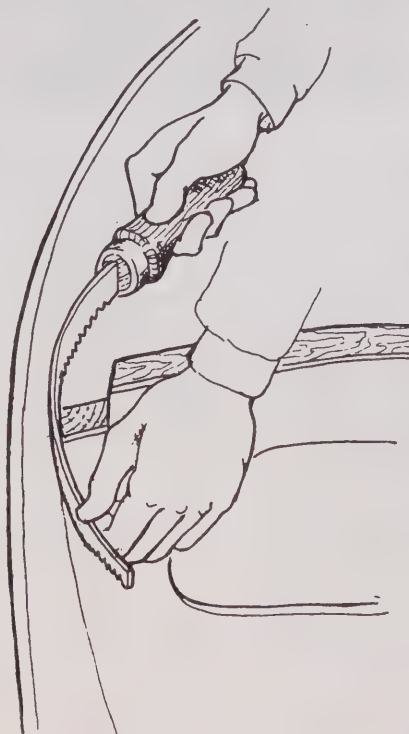
Although rarely necessary, you can clean the tool with vinegar or other cleaners. After using it awhile, you'll wonder how you ever got along without it.

Scarphing the Bottom Panel: Scarphing a piece of 3/4" ply is no small job. It took four hours of hard work. The power planer decided to break a belt, and it would take ten days to get one by mail. It was finished with the disc grinder, belt sander and block plane.

Follow the same method you used for scarphing and gluing the side panels, (described in an earlier installment). Let cure a minimum of a day before moving and four days before applying any stress.



Install Sheers: Cut out slots at corner of bulkheads to accept sheers. Using coarse file clean out slots, then use a panel saw like a flexible file to reach areas you can't reach with the file (see illustration).



Use sheer sample piece to make sure sheer will go into slot, also, finish fit slot at stem using sample piece.

Measure distance along curve of hull; that's the length of the sheer piece (better to be a little short). Fill any gaps with thickened epoxy putty.

Important: To save yourself black thumbnails and smashed fingers, install stop blocks flush with the inboard side of sheer at slot at top of bulkheads. This keeps the sheer from its natural inclination to spring inboard (see photo with arrow pointing to one block).

Use bar clamps to push sheer into slot (see photo). Have the drill, nails and hammer ready. Glue and install both sheers.



Turn Hull Over: This is easily done without outside assistance. Turn over leaving tank top, food store cover and diagonal braces in place (see last issue).

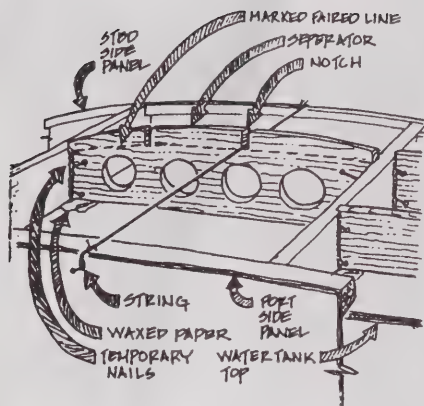
Install Chine: Identical to sheer except, more screw clamps are required. Some have to be combined to pull against the hull and push. Also, they'll take any twist out. Glue and install chines.

Separators: Make water tank and food store separators, ensuring you have enough material for fairing. Glue and install. No nails are necessary except, use a few straight nails (toe nailed, coated with goop) just to keep them from sliding down. Remove nails after glue dries.

Fairing Bottom: It must be thought of as fairing in two directions; sideways and fore and aft.

First, check fore and aft for the arch of the bottom. I used a mast side as a fairing batten. Bend over hull, draw a line of the faired curve on each separator (see illustration).

Hull should be level, still on 4x 4's. Cut a few narrow slots in separators. Pass a taut string across the hull, it should agree with slot in separators and with line level, correct as necessary and finish fairing.



Install Bottom-Trial Fit: The purpose of the trial fit is to guarantee proper alignment when glued in place. Equal overhang at each side is required.

A centerline should be drawn on both sides of bottom panel. Ratchet strap or tie bow down, tack one nail into stem at centerline. Place heavy weights at rear. Centerlines at bow and stern are now aligned. Check overhang at each side of hull, it should be equal. Adjust and mark ply position, when they are equal.

Important: Before bottom is installed make a template of hull side curve where chine runner will be installed. This will be used to make chine runners lumber. It is vital to the success of making a good chine runner.

Install Bottom: The bottom establishes hull strength. It takes a lot of glue to install the bottom, best to have help to do this task, one mixing and one applying the glue. Mark the side of the hull to indicate where bulkheads are located, you'll need these marks to nail the bottom to bulkhead frames. Water tank and food stowage separators will be filleted later so there's no need to nail them. Apply glue to hull and nail bottom in place.

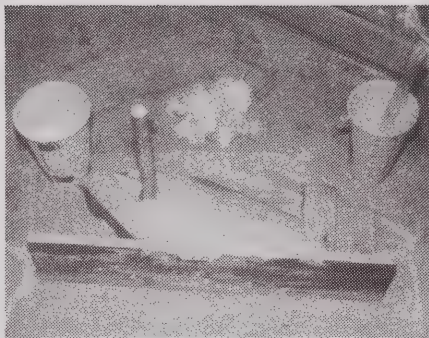
Lower Pintle: This pintle is a custom part. It has to be made by you. A conventional pintle can't be used here, the blade wants to set close to the hull; rotates through 180° and must turn without interference both to port and starboard.

To make the pintle you need the following: (1) a mold; (2) chopped fiberglass cloth; (3) micro fibers; (4) strips of woven roving; (5) cellophane tape, (6) masking tape (7); 5/8" dowel.

Measure two angles needed to make mold (see plans). Make mold from wood, plywood and dowel. Lay cellophane tape on all interior surfaces of mold (avoid using any wax or grease near the boat).

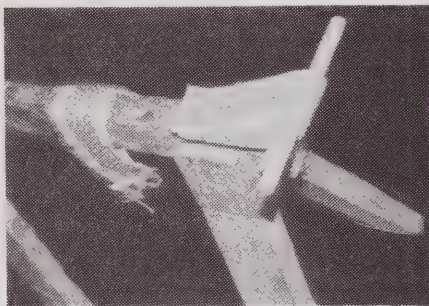
Pure epoxy is not strong enough for this task and must be reinforced with micro fibers and chopped fiberglass (you can make your own chopped fiberglass by cutting tiny pieces from cloth). Try to get a high chopped glass and microfiber to epoxy ratio mix in the molding process, it should be like a pile of wet hair.

Stuff it into the mold, pack it in tight with a stick, slightly above the top.(see photo) Let it cure no more the a day, so you'll have a good bonding surface for the cloth.



Important: Make certain every piece of tape is removed from pintle.

To hold pintle while laying on the cloth, hot glue it to a saw horse, you can just epoxy glue it and just chip it lose later.



Cut woven roving in strips, mask tape all edges, both sides (see photo). It's best to do one layer at a time, letting that gel before applying the next. The cloth must go on as shown on the plans.

General Fiberglassing: Successful epoxy fiberglassing can only be done one way, no matter what anyone says. Here's what's important and why:

The most important thing is not to float the cloth. Some instructions say after the cloth is saturated to add epoxy to fill the weave. You'll create a disaster if you do that.

There are two types of fiberglass cloth finishes you want to end up with, also, two reasons why cloth is applied in the first place.

The finishes are; (1) a smooth surface (visually), but not exposed to abrasion and constant immersion; (2) one that must be waterproof (underwater) and could be abraded. The ways you make both are different. Here are the initial steps just to get the cloth onto the surface without it floating (fiberglass cloth only, woven roving is treated differently).

1. Putty all surface defects, sand lightly and brush the surface clean.

2. Squeegee on a thin coat of epoxy resin; wait until it cures dry (barely noticeable that it's tacky to touch, or just cured if horizontal surface). Do not try to lay cloth on a wet or on a tacky surface.

3. Layout cloth, smooth out flat with your hands.

4. This is the most important step. The object is to saturate the cloth without floating it off the surface of the plywood. This really occurs more readily if the ply has been pre coated and cured hard. This is how it's done.

The object is to wet out the cloth only enough to, (1) adhere it to the surface, (2) fill the cloth with epoxy. The method used is to constantly spread the epoxy thin (with the same kind of pressure you'd squeegee a window), into the cloth. Do not pour and pool the epoxy in one area with out spreading it thin. Work large areas, leaving white areas to come back and fill in. Do not add epoxy to an area that has darkened. Slight white spots might appear in places; give the epoxy time to spread, don't add more resin. Keep the surface with the weave visible. If there's small white areas left it's best to come back with a brush with a little epoxy on it.

5. Leave to cure, until it gels. Do not add anymore epoxy until this time or the cloth will float. If you add epoxy while its liquid it'll float the cloth, leaving a hilly surface. If you have some pin point, white spots (shouldn't really be any), it's not at all important. The cured strength of the epoxy is so great it's not going to effect the area at all. If we are after a waterproof surface, there will be more epoxy added over that white spot. (see upcoming article; Water Tank Coating).

If the location of the finish is only a smooth surface not exposed to abrasion or submersion (like the hatch cabin top as an example), don't lay a second coat with pure epoxy resin but use a fairing putty mix and when faired off coat with a thin layer of epoxy over the putty with that and paint, it's all you need.

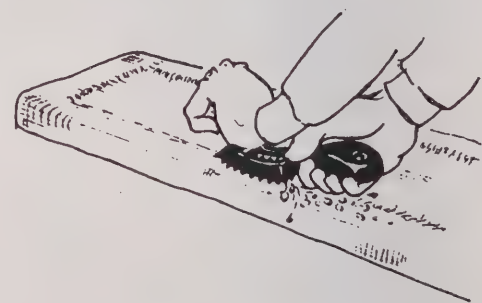
Later, when we have to develop a waterproof epoxy finish (water tanks) that process will be described in detail.

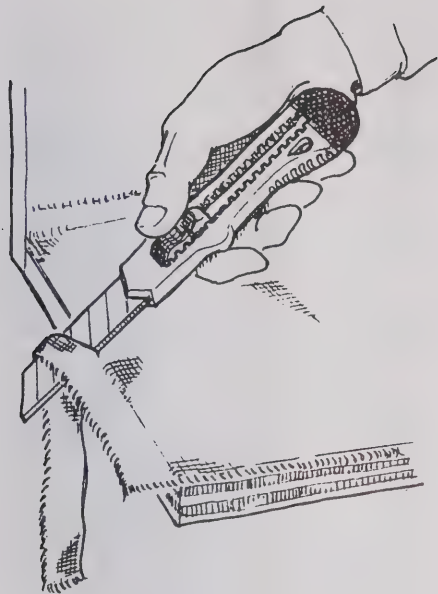
In all cases, you want a cured epoxy coat under the epoxy putty. The sander wants to cut away the soft putty while leaving the hardened epoxy coat. Don't use pressure while sanding, better to add more putty than to sand into the epoxy coat. If the epoxy has cured over four days, scuff surface before applying putty.

Here's a couple of techniques that may prove useful (see illustrations):

(1) Soften edge of cloth end by scraping with small surform tool, then putty to smooth out. (2) Trimming excess cured cloth is easier if the knife is tilted, rather than cutting straight up and down. (3) Use a hollow drinking straw to remove specs of dirt, (or anything that puts streaks in the finish) carry this item as you move around.

Fiberglass cloth both rudder and rudder blade. After puttying, sand smooth and apply a thin, seal coat of epoxy.





Drill Rudder for Lower Pin:

There are many boat building books that show various jigs to drill holes. From experience with these devices, I found myself shocked to find the holes drilled crooked and off track through the part. The best way, to borrow the words of Luke Skywalker, is to, "Let the force be with you."

Position the rudder to the hull with it in the top pintle. Draw the shaft centerline on the side of the rudder.

Lay the rudder perfectly flat, clamp it down. Position someone at the side so they can tell you if you're level when drilling, you will be viewing from above, lining up visually with the line drawn on the rudder.

Drill about an inch, stop, insert (same size) wood dowel into the hole. Evaluate the drill direction. Drill again, correcting the direction if necessary. Check again, continue until you have drilled through the rudder. Correct any deviation by filing.

Scuff bronze surface with coarse sand paper, mix epoxy, and precoat both surfaces. Add Cab-O-Sil to epoxy. Coat both surfaces with thickened glue mix. Slide bronze shaft into correct position. At bottom make sure the end of the shaft is at least 2mm down in the hole to allow for epoxy capping. Set aside to cure.

Coming Next: The next article on building *Paradox* will include "Lexan" "Windows and Jigs", "Sails", "Water-tanks", "Food Lockers", and "Side Bins and Hinges".

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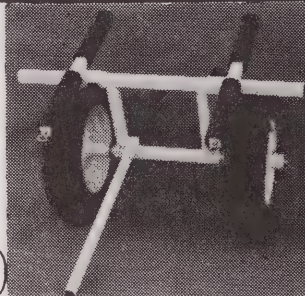
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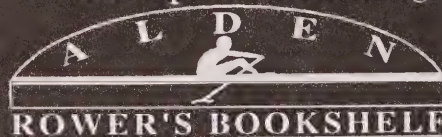
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The Bronze Age

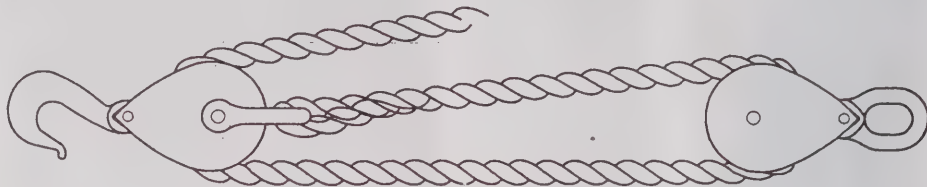
The inspiration for our business came from an Herreshoff built Buzzards Bay 15 restoration project I have been working on (my own boat) for some years. Discovering that nobody was manufacturing quality new bronze blocks for old style boats, and finding used ones in good condition very rare, I searched for someone to make them for me.

I heard that Thomas Lie-Nielsen was planning to make them and when he finally decided not to, I realized that I would have to make them myself. The ball bearing modification idea came to me when I was drawing up plans to make these Herreshoff design blocks, and with it I knew I had something that would have appeal to others.

We introduced, and have been manufacturing, Herreshoff style blocks with our exclusive ball bearings for over a year

It all began because we fell in love with this ca. 1905 Herreshoff Buzzard's Bay 15 and decided to restore her.

J. M. REINECK & SON CLASSIC BRONZE YACHT BLOCKS MANUFACTURED TO MODERN ENGINEERING STANDARDS



now. Our blocks have been used on all of Dave Corcoran's new Buzzards Bay 15's since the summer of '95; *Teaser's* head sail rig, a 1926 Herreshoff Newport 29 Class sloop restored by Ballentine's Boat Shop and featured in the '96 *WoodenBoat* calendar and at the *WoodenBoat* show last summer; Larry Gillen's new *Silver Heels* launched last summer; the four 12-1/2's owned by the Forbes family on Naushon Island; Randy Milner's *Biscayne Bay 14*, also at the *WoodenBoat* show last summer; Joe Youcha's new *Flat Fish # 1*, designed by Joe White, and two others at the Alexandria Seaport Foundation, and more. Joel White recommends our blocks to those who ask. All have had nothing but raves for our product, no failures, no problems, and all freely recommend us.

We are, to my knowledge, the only manufacturers of such *high tech* bronze

yacht blocks. At this time we have the 3/8" and 7/16" blocks in production, and are in the process of tooling up for the 1/2" size, which will be ready by mid-winter. We are, however, not limiting ourselves to Herreshoff designs, and will introduce other quality designs that we feel are appropriate.

We are very proud of the fact that our product has gained much attention in three product reviews; one by Maynard Bray in *WoodenBoat* #130, another in *Classic Boat* #102 published in the UK (Dec. '96 issue), and the third in the *Chesapeake Bay Magazine*, July '96. Maynard's article has been especially good for us since he is such a recognized authority on "all things Herreshoff". He, incidentally, was the only one who asked for actual parts and drawings to study, prior to writing the review. The review in *Classic Boat* is too recent to tell, but we anticipate that the foreign market will be an active one.

Background information on our product design philosophy may be of some interest. While attempting to make these blocks as authentic in appearance as possible, we use modern manufacturing and engineering techniques and materials. We redesigned them to accept a *Delrin ball bearing. This bearing is of a double row design similar to the best modern racing blocks. It has 18 balls per row, a total of 36. The bearing races are precisely machined on computer controlled machines.

We have made every effort to ensure that our product is both aesthetically and technically correct. Extensive research at the Hart Nautical Museum at M.I.T. (which has the Herreshoff Manufacturing Company records and drawings), has been done to verify dimensions and materials. Copies of all the drawings relating to the Herreshoff blocks and attachment hardware available in the Haffenreffer-Herreshoff Collection have been obtained and studied. Many original blocks have been disassembled and examined.

We have discovered and incorporated machining features not specified on the HMCo. drawings. The casting records have been compared with our own material testing results of original parts to verify materials and processes. We have produced all new patterns for the castings we make. Our parts are precisely machined to produce accurate and strong assemblies.

The use of proper materials and manufacturing and machining processes produce parts true to the original designs. This is important for design strength and intended use. Our casting are made from the same al-



loy specified for all the cast parts of the blocks on the casting records of the HMCo. This alloy is specially ordered for us and used only for our parts at our foundry.

The rivets and shafts that hold the blocks together and support bearing loads are of "Tobin Bronze", also originally specified. The blocks are riveted, as were the originals (although I believe the originals were machine riveted, while we do ours by hand at this point). By assembling in this way, the rivets expand in the body of the shell casting and form a head just below the surface of the shell. The result is a very tight, strong assembly that will not come apart or work itself loose.

These metals have the right combination of properties; strength, corrosion resistance, castability, minimal shrinkage and cold formability (riveting) to do the jobs required of them.

We believe that the importance of using the original alloys, casting processes and precise machining is obvious; it preserves the original proven durability, quality and aesthetics of the product. To cut corners by using other methods jeopardizes this. Our blocks, we believe, have strength, reliability, longevity and aesthetic appeal comparable to the originals, with the added value and performance of the modern *Delrin ball bearings.

I am a mechanical engineer with over 25 years of experience in research, design, development and manufacture of precision products for high tech markets. The Herreshoff blocks are not complicated to manufacture, but they do take a mechanical engineer to understand the subtleties of what is important to the function and durability of these deceptively simple creations. It also requires knowledge of manufacturing processes, a commitment to quality and a willingness to put some work into them.

My first sailboat was an Annisquam Fish ("Montycat") built in Annisquam, Massachusetts in the early 40's (see the January 1, 1986 issue of this magazine, Volume 3, Number 16), from which I still have the original cotton sail and the rudder. I have been the owner of an original Herreshoff Buzzards Bay 15, circa 1905, since 1976, and have been restoring it since 1981. This will be a complete restoration, with only the original planking, dead wood, ballast and rigging being reused (all new fastenings, 2500 new screws).

We also own a Ralph Winslow Class W 25' day sailer built in 1938 (bought through this magazine's classified ads) and a 12' Essex Class gunter rigged sailing dingy designed and built by the North Carolina Maritime Museum in 1981. All of these boats are wooden and all except the Essex, well over 50 years old, and by modern standards are over-canvased (I am a sucker for sail area).

Mary, my wife, has worked in several small companies which valued her attention to detail as a bookkeeper and office manager, and for her skill in woodworking and detail painting.

Son, Jared is two days older than our company name (about a year and a half now), and we have much hope for his future



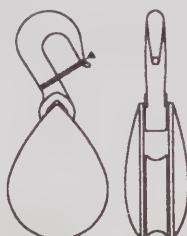
Blocks on the rocks, beautiful but rugged.

help.

Together as J. (Jim) M. (Mary) Reinick & Son (Jared), with a quality product, we think we have the necessary core for a successful business. I have recently left

my full time job to pursue this work and we are now totally committed to our product line!

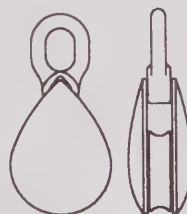
*Delrin is a DuPont Registered Trademark.



Plain Hook

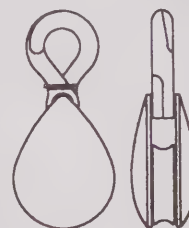
(Mousing Hook)

3/8" Block; 4217 + 4216
7/16" Block; 4750 + 4751



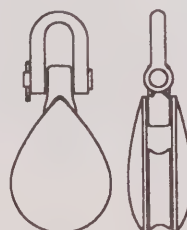
Traveler Link

3/8" Block; 4217 + 4219
7/16" Block; 4750 + 4757



Sister Hook

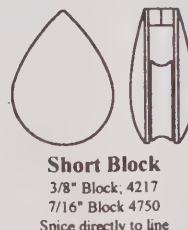
3/8" Block; 4217 + 5641
7/16" Block; 4750 + 5641



Shackle Link

3/8" Block; 4217 + 3377½ (Front)
7/16" Block; 4750 + 3377 (Front)

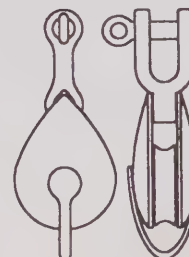
Specify front or side drilled.
(front drilled shown)
Shackle is optional.



Short Block

3/8" Block; 4217
7/16" Block 4750

Spice directly to line



Upset Shackle

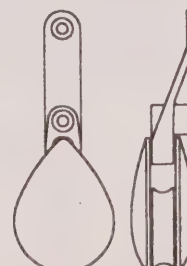
3/8" Block; 4217 + 4732
7/16" Block; 4750 + 4752

Note on Mousing:

Where additional security is desired, the Plain Hook, Sister Hook, and Span Hook can be moused as shown

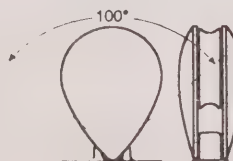
Beckett;

Optional on all 3/8" & 7/16" blocks
(3/8"; 4773; 7/16"; 4757½)



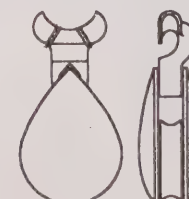
Throat Hanging

3/8" Block; 4217 + 4213
7/16" Block; 4750 + 4755



Lead Block Eye

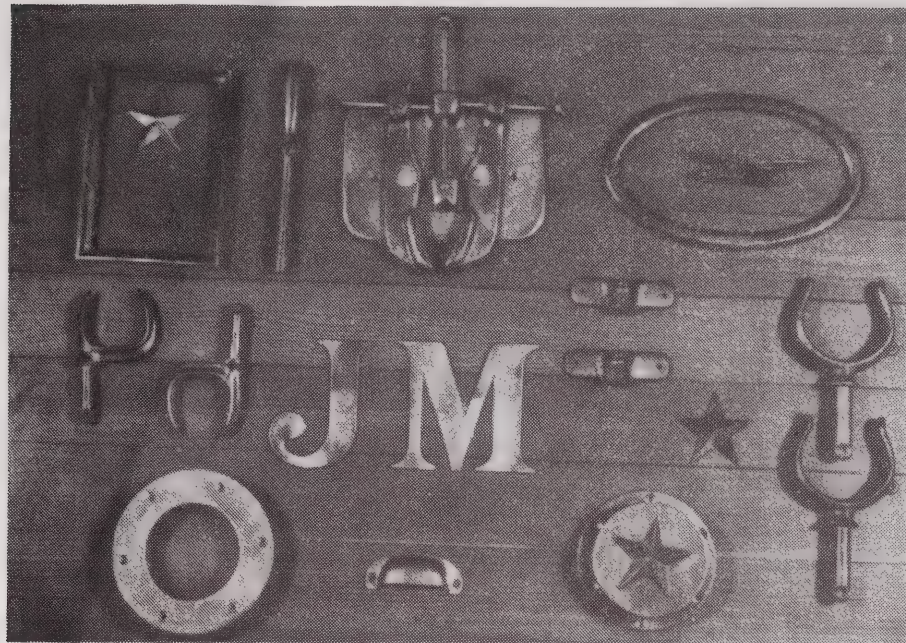
3/8" Block; 4217 + 4214
7/16" Block; 4750 + 4754



Span Hook
(Gaff Saddle)

3/8" Block; 4217 + 6758
7/16" Block; 4750 + 5540

J.M. Reinick & Son, 9 Willow St. Hull, MA 02045-1121. (617) 925-3312



The Bronze Age

Oarlocks on Your Own: How to Build an Electric Foundry for Casting Bronze

By Jack McKee

Small foundries are remarkable. There's something magical about taking a chunk of metal, heating it until it's liquid and pouring it, as if it were thick water, into a sand mold, letting it cool and then "discovering" the object hidden in the sand. But a small bronze foundry is not beyond the grasp of anyone with a basement or backyard, a few dollars to start things up and a willingness to learn new skills.

I've been able to make quite an array of small boat hardware in my little basement foundry. Oarlocks, for instance, were easily made using my favorite set as patterns and, once my foundry was set up, they cost only \$2.00 per pound plus my labor. But I'll warn you, soon after you make that first set friends may begin to show up with one really nice old cleat or one beautiful old bow chock. They'll stand around and shuffle their feet, mumbling how nice it would be to have two cleats or two bow chocks. They probably also want a couple of belaying pins and a star for the bowsprit, but are too polite to ask.

Besides oarlocks, I have made stars, belaying pins, buttons, deadlights, cleats and picture frames. I designed and made oarlock sockets for my Gloucester Gull dory because none were available that had an angle consistent with the flare of the hull. I've been asked to make parts for a potter's wheel, nameplates and rigging vises. One fellow even asked me to make 10,000 motorcycle brake lever handles in the shape of naked ladies. Although you won't get rich, it is fairly easy to pay for your foundry equipment and material you use by trading or selling castings to friends.

Before I built my own foundry furnace I had been thinking and reading about small foundries, but kept resisting the idea of a gas furnace. A friend of mine had a gas furnace that he used for melting glass. I spent many hours watching him and asking questions about furnace construction, but I couldn't get used to the noise (like having your head under the hood of a car idling at full throttle) or my fear of a gas leak. So, to make a long story short, with the help and advice of my friend and a little research, I built a small electric furnace patterned after a potter's kiln. It is inexpensive, quiet, portable and it works great!

Here's what I bought for about \$150 for my furnace:

A 25-gallon oil barrel, 14" in diameter with a lid. I found mine at a gas station.

A 2,400-watt Kanthal pottery kiln element. Buy the element unstretched. You'll be stretching it to fit the inside of your furnace. This Kanthal heating element is good to 2,500°F, which is about 250°F hotter than a Nicrome element can tolerate. This ability to repeatedly withstand temperatures of 2,500°F allows heating silicon bronze to 2,250°F for pouring in thin shapes without damaging the element. A new 2,400-watt Kanthal element costs about \$25 and is available at pottery supply stores.

A thermocouple and meter for reading furnace temperature. You can buy an already calibrated meter at a pottery supply store (where you'll find the thermocouple), but it will cost about \$50. A cheaper solution is to buy a milliamp meter at an electronics store. Hook it to the thermocouple and calibrate it with the aid of someone else's pottery kiln. Attach your thermocouple to their kiln and, as the temperature rises, mark your own meter to match the readings to the one on the kiln.

About 15 soft firebricks rated to 2,600°F. 3 x 9 x 4-1/2" is the best size.

About 14 square feet of ceramic fiber blanket insulation. I bought 1" thick, 8-pound density insulation with the trade name Fiberfax. Another brand is called Kaowool. This is a "space age" insulator that will allow you to keep the outside temperature of your furnace at about 300°F while the inside glows at over 2,000°F. The only practical way to get these temperatures without this very effective insulation would be to use substantially more soft brick and/or a much larger heating element.

A heavy-duty 15-amp, 220-volt switch. Available at a hardware store.

Stainless steel wire. Available at a hardware store or use an old wire oven element.

Ceramic buttons. You might be able to find these at a pottery supply store, or you could substitute small pieces of stainless steel.

This is how it all goes together:

1. Cut the oil barrel so it stands 13-1/2"

high.

2. Line the bottom of the barrel with two layers of the 1" ceramic fiber blanket insulation. Insulation 1" thick will compress to about 3/4". Fiberfax comes in rolls like fiberglass insulation only it is denser. You can cut it with a matt knife or scissors. Be sure to wear a dust mask and a long-sleeved shirt while you're handling it; like fiberglass it will irritate your skin and is bad for your lungs.

3. Cut the soft firebrick for the furnace using a slow bandsaw with an old, dull blade; if you don't have a bandsaw, a hacksaw will do the job. There should be two layers of soft brick, each 3/4" thick, in the bottom of the furnace. Plan your cuts ahead of time so that all joints are overlapped by the next layer and spilled bronze won't be able to find its way down to the insulation layer below. After the two layers of soft firebrick are in place on the bottom of the furnace, line the sides with two layers of Fiberfax.

4. Cut five 3 x 9 x 4-1/2" soft firebricks in half to make ten 1-1/2 x 9 x 4-1/2" bricks for the sides of the furnace. These bricks will hold the heating element and protect the insulation from spillage. Mark for six equally spaced 1/2 x 1/2" grooves to be sawn and chiseled in eight of the bricks to hold the heating elements. Your saw cuts need to be inclined as shown in the drawing so gravity will help hold the elements in place. Use a hacksaw or bandsaw to make these cuts, then chisel out between them and use a small, round rasp to smooth the inside of each groove. The grooves in the last brick must be at an angle so the wire can go from one row to the next as it spirals around and down the inside of the barrel. Now you need to cut edge bevels in each brick so that they will fit snugly against one another. Unfortunately, the barrel will probably be a little out of round and the Fiberfax will not be completely uniform in thickness, so each brick bevel will need to be a little different. Bevel and fit each brick into the furnace one at a time.

The last brick should fit tightly and hold the others firmly in place. After the barrel is lined with Fiberfax and soft brick, the space remaining in the center of the furnace would be about 8" in diameter. A No. 6 crucible is 5-1/4" in

diameter and you will need this extra 2-3/4" to fit tongs in around the crucible to lift it in and out.

5. Cut a 1-1/2" observation hole in the center of the lid of the oil barrel. This will be covered with a piece of Fiberfax during furnace operation. Next, position two layers of Fiberfax on the underside of the lid. You'll be attaching these to the lid using stainless steel wire and about 12 ceramic buttons. Space the buttons evenly, drill two small holes in the lid behind each button and thread the wire through the buttons, through the insulation and through the holes in the lid, twisting it tight on top of the lid as shown in the drawing to hold the buttons in place.

6. Now you need to drill holes through the barrel, Fiberfax and firebrick to attach your 220-volt, 10-amp power leads, one at the top and one at the bottom for hooking up to the beginning and end of the heating element spiral. Drill 3/4" holes in the barrel and smaller holes in the brick. The larger holes in the barrel will allow plenty of room to insulate the element ends from the barrel by wrapping them carefully in Fiberfax.

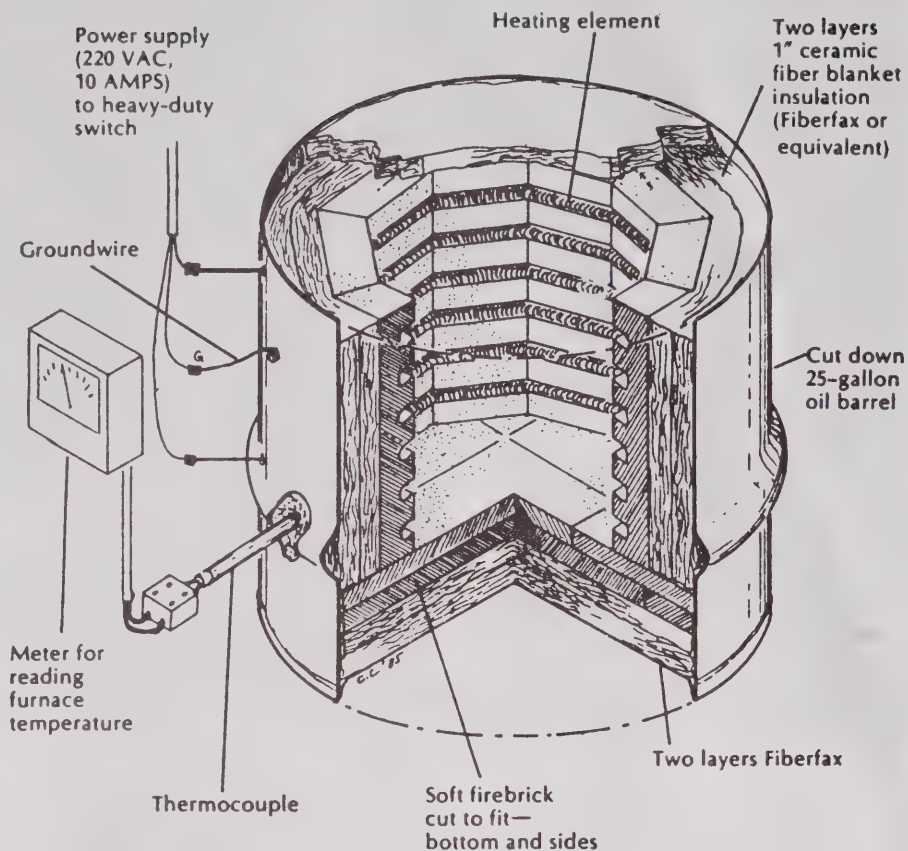
7. Drill another hole on the side of the barrel near the bottom of the furnace for the thermocouple. The tip of the thermocouple should project, at an angle, 2" into the bottom of the furnace so it will measure the average temperature.

8. Stretch and install the heating element. Connect the element ends to a 220-volt power source that has a 20-amp circuit breaker. Ground the barrel by fastening a wire to the barrel and running it to the ground wire of your house wiring. This is a very important safety measure. With the barrel grounded, a short circuit will just cause a few sparks and throw the circuit breaker. Without the ground you could receive a severe shock. If you have any questions about the wiring for the furnace, consult a licensed electrician. When you're using the furnace it should be turned around so that the wiring is on the back, between the furnace and a wall and out of the way from accidental bumps.

9. Install the pyrometer, the thermocouple and milliamp meter.

Now, a word of caution to those with no foundry experience. Building the furnace is the easy part. Learning about patterns, gates and risers, molding sand and the actual use of the furnace are all more difficult, but by no means impossible. C.W. Ammen's excellent books, *The Complete Handbook of Sand Cast-*

The small electric foundry furnace



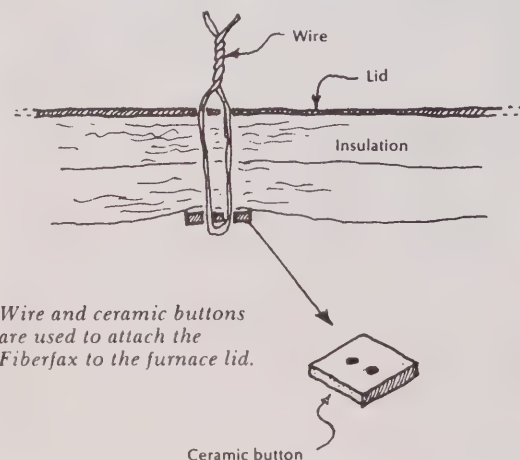
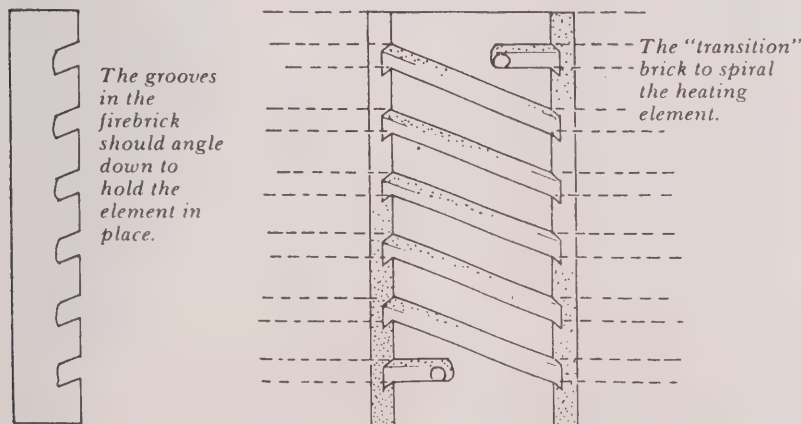
ing, The Metalcaster's Bible and Constructing and Using Wood Patterns (Tab Books) will provide you with some good instruction.

Once you have built the furnace, the actual pouring is not that far away. The first pour is always exciting. I made three major mistakes the first time though; the sprue was too small, I used scrap bronze of indeterminate composition and I didn't have a pyrometer. The result was a rather incomplete oarlock, but I was happy to have actually poured bronze.

Although you'll probably be as impatient as I was, I suggest you start with small amounts of aluminum first, which melts at a lower temperature. Once you are successful with that, then move on to small amounts of bronze. It takes a while to get used to the heat and to be comfortable maneuvering the crucible. Go

through the motions of pouring with a cold crucible for practice. There are a few things I've learned from my various pours that I'd like to pass on to you.

Element size: My furnace melts 15 pounds of bronze in about 90 minutes. The relationship between furnace size and element size is critical. The furnace will take forever to heat up with too small an element; I once melted bronze in a small pottery kiln and it took over three hours to heat up. On the other hand, too large an element doesn't allow time for the heat to pass from the element through the bronze. Once, thinking more is better, I put a 3,200-watt element in my furnace and the element melted long before the bronze did. If you're building a furnace from my directions, I recommend the 2,400-watt element.



They're a good match.

Crucible size: A crucible will hold three times its size number in pounds of bronze. Therefore, a No. 6 crucible will hold 18 pounds of bronze, or about a quart, and a No. 8 crucible will hold 24 pounds. With a full No. 6 crucible I can pour five pairs of small oarlocks, ten 6" cleats or four belaying pins and a deadlight. Quite a bit of bronze gets used up in the sprues and gates, but this can always be re-melted in the next pour.

Bronze: The beginning bronze founder will be confronted by hundreds of kinds of brasses and bronzes and the choices can be confusing. In the appendix of one of his books, C.W. Ammen lists 34 kinds of general mixes, gun bronze, red brass, bearing bronze, four types of statuary mixes and plumbers' mix, just to name a few. He lists 15 different bell mixes. The tone of a bell depends, in part, on the composition of the metal. Fire engine bells are 20% tin, 2% copper, 1% silicon and the rest copper; railroad signal bells are 60% copper, 36% zinc and 4% iron; sleigh bells are 40% copper and 60% zinc. You can see how complicated it gets.

I think silicon bronze is a good bronze to start with. It is almost as strong as mild steel, it can be re-melted over and over, it doesn't need a deoxidizer, it has excellent corrosion resistance and its fumes are less toxic than those from many other types of bronze. Practice with just one type of bronze until you can pour good castings consistently; using different kinds of bronze or trying to mix your own can come later.

Using scrap: Even if you can get it for free, I think scrap bronze is usually a waste of time for beginners. Bronze ingots only cost about \$1.35 a pound from a metal supplier, and if the time you spend in mistakes is worth anything at all, \$1.35 a pound for bronze is cheap. With ingots, the exact composition of the metal is known and it will pour the same, at any given temperature, time after time. If you use scrap you'll never know. If your neighbor drops off a few old bathtub fittings and you melt them with pieces of an old propeller that has been lying around, it will be difficult to calculate the correct pouring temperature and the results can be discouraging, short pours from pouring too cold or cracking from pouring too hot. Sometimes, I confess, I'll use 10-15% scrap when I'm pouring items where strength isn't important.

Pouring temperatures: They're critical for a good casting. If, for example, you want pairs of large and small oarlocks and some thin letters all from one pour, you will have problems. Thin sections are poured hotter and thicker items are poured cooler. To minimize shrinkage and to maximize strength, try to pour as cool as possible without pouring short, that is, having your bronze solidify before completely filling the mold. In our example of a mixed batch, the large oarlocks, because of their thicker sections, should be poured cool. The small oarlocks should be poured a little hotter and the letters, because of their thin sections, hotter still.

Sometimes when you're pouring items that require different pouring temperatures, you can pour the thin sections first, figuring that by the time you get to the thicker, heavier items, the crucible will have cooled off some. In the example above, though, it would be best,

because of the extremes in thickness, to pour the large oarlocks first and then reheat the crucible for the smaller oarlocks and letters. Just 50-100°F can make a big difference. If the letters are poured at the cooler temperature, they will be poured short. And if you pour the large oarlocks at the hotter temperature, they will shrink and crack where the three arms meet. Thin sections of a casting cool first and, as they cool, pull metal from the thicker sections. The thicker sections cool last and as they cool, they shrink; if there is no hot feed metal (a riser), the casting will generally shrink and crack.

In order to figure out the right pouring temperature for a difficult piece, I sometimes pack five boxes of the same thing. I increase the pouring temperature by 50°F for each successive box, starting at, say 2,000°F. When the boxes are broken open, it is easy to tell the ones poured too cold or too hot. After a while, experience will help you along.

Sand: Foundry sand is made of sand, clay (approximately 5%) and either water or oil. These ingredients must be mixed in a muller, which has wheels that actually press the clay particle around each grain of sand. Most people are amazed to see how well foundry sand sticks together, and it needs to, to hold its shape when the patterns are pulled out. After it has been packed, oil sand can actually be sliced like a loaf of bread.

Foundry sand mixed with water is called green sand and costs about \$10 per 100 pounds. It takes quite a bit of practice to keep its moisture content right; if it's too dry the sand will fall apart, and if it's too wet it can explode as the contained water turns to steam. I prefer using oil sand, sometimes sold under the brand name Petrobond. It holds together well, leaves a good finish and the boxes can be packed and then left for several days before pouring. I have used oil sand as a core sand, too. The big drawback to oil sand is its price. Here in the Northwest, the cost varies between \$25 and \$60 for a 100-pound bag. If you can't find it at what seems like a reasonable price, you might try ordering the ingredients from a foundry supply business and having someone with a muller mix 1,000 pounds for you. That should supply a small foundry for a long time. Because mullers are expensive and most companies that have them mix tons of sand at a time, it may be difficult to find someone willing to mix a smaller batch for you.

After you've used the oil sand for a while, it starts losing its zip. The oil burns out and the sand won't hold together. It really needs more oil, but it is time-consuming and difficult to mix two cups of oil into 300 pounds of sand with an electric drill; even that technique won't mix very thoroughly. It really needs to be re-mulled, perhaps with a little clay added, too. I made a sand mixer that makes the job of adding oil or clay to the sand much easier and partially mulls the sand, although I have not succeeded in getting it to mix good sand from scratch. The mixer is made from the bottom of an oil drum, is powered by a 1 hp motor and has two paddles and a heavy lead wheel which mixes and presses the sand.

Splicing heating elements: Sometimes molten bronze slag will find its way to the heating element, causing a hot spot that will eventually burn through. If this happens, splice the ends back together as follows: Cut out the burned section (usually just 1/2" or so), then

heat both ends red hot with a propane torch and stretch them out straight for 1-1/2". Cool, sand the oxidation off, then re-heat and twist the two ends together tightly.

Safety: The safety aspect of foundry work too often tends to be glossed over or forgotten. But imagine how it would feel to be splattered with molten metal. You should always wear a long leather apron, leather jacket, shoe protectors, cap and eye/face protection when pouring. Wear heavy leather welder's gloves. Check the crucible for cracks before each use and always be especially careful not to pour into anything containing moisture or to put anything that might contain moisture into a hot crucible. The moisture immediately turns to steam which, escaping under pressure, can splatter hot metal everywhere. When adding cool pieces of metal to a hot, half-full crucible, warm the cool pieces first on top of the furnace to drive off any moisture. Just a drop or two of moisture in my ingots once splattered molten bronze on my jacket, head and face shield. It taught me to be much more careful.

Wear a long-sleeved shirt and a dust mask when working with ceramic fiber blanket insulation. Too many people have the attitude that chemicals or fumes that don't make you sick on the spot must be OK. Hopefully, we have learned from asbestos the danger of this attitude.

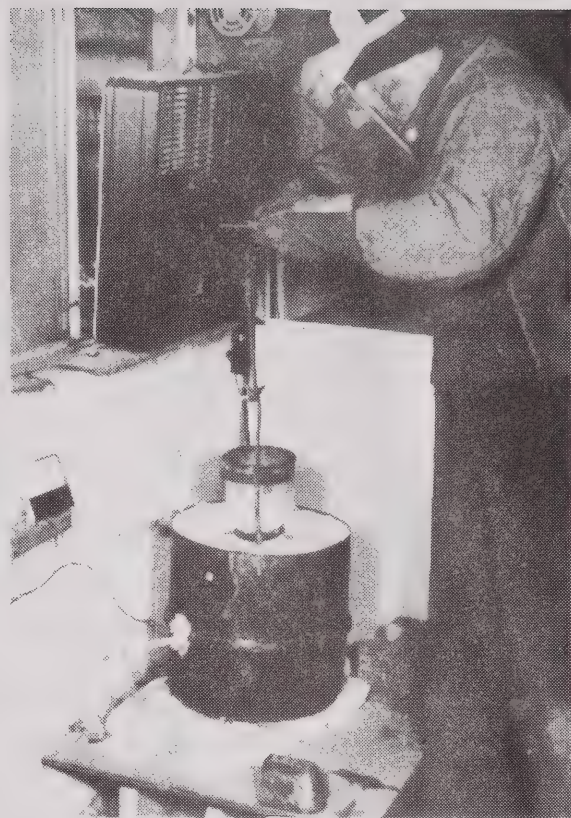
The inhalation of metal fumes can cause acute symptoms, including dizziness, headache, fever, nausea as well as more serious chronic damage and illness. I try to minimize my health risks by using silicon bronze which doesn't contain lead or much zinc, by using forced ventilation over my furnace area and by not pouring all day, every day.

As with any 220-volt electrical appliance, your foundry furnace has the potential to be dangerous. To repeat some electrical safety considerations: (1) The wires coming out of the barrel should be carefully insulated so they won't short out against the barrel. Do this by drilling large holes in the barrel and wrapping the element ends with ceramic fiber blanket insulation. (2) Ground the barrel. (3) Construct and position the furnace so that you cannot accidentally bump the electrical wires. (4) Be sure to unplug the furnace before each pour.

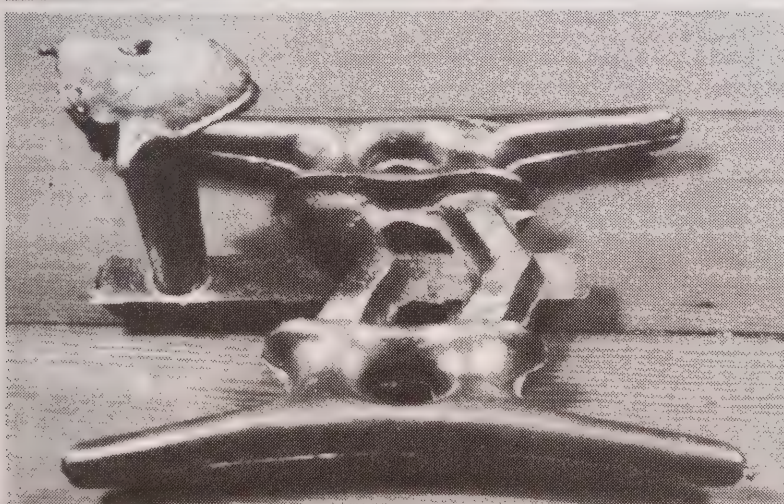
Fire is another danger. Highly flammable liquids or foams should be kept away from the furnace, preferably in another room. Keep a fire extinguisher close by, as well as a large box of sand for smothering those inevitable little fires. Keep a smoke alarm near the furnace and wait around after pouring until things cool down to be sure all is well and nothing catches fire.

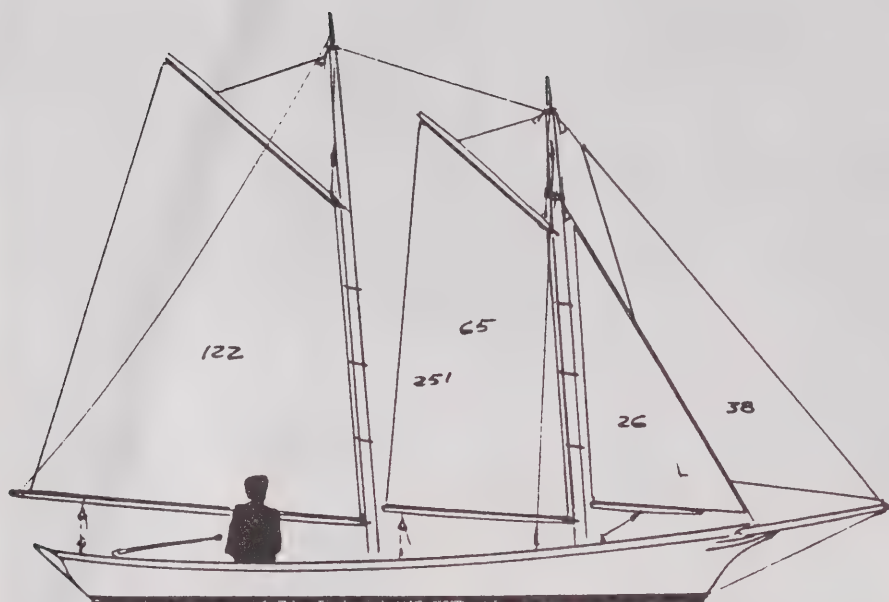
For over 5,000 years people have appreciated the beauty of cast bronze and depended upon its utility. Even in this day and age of high-tech electronics and mechanical complexity, there is a place for the ancient and appropriate technology that a small bronze foundry represents. Bronze casting has played an important part in the history and tradition of wooden boats, with small foundries everywhere producing the beautiful boat fittings that are so hard to find nowadays. The small home foundry is a way to make those graceful oarlocks, chocks and cleats available again.

Jack McKee lives in Bellingham, Washington, where he takes care of his two kids, does carpentry work, pours bronze and builds an occasional small boat.



Pouring a casting: Clockwise from above: Adding bronze to fill a crucible at approximately 2250F. Lifting the crucible from the furnace. Pouring. The weights on the boxes keep the top box from floating. Two 6" cleats shown with the sprue and gates, just as casting comes out of the sand. Rejects: Letter "R" is a runout, during pouring the top box lifted allowing the bronze to run out between the boxes. Letter "D" is a short pour, the bronze cooled before it completely filled the sand mold. Bottom is my first casting, an oarlock!





Early schooners were like the cat-schooner discussed in Rig 71. The original ancestor of the breed was a cat-schooner with two spritsails, or even lateens if you go back far enough.

The "modern" 1890's rig of this cartoon was part of a 100-year evolution that eventually improved the rig out of existence, as I'll show in a couple of later essays.

The traditional advantages of the rig, as it developed, were, first, that the largest sail was aft where it could be hoisted first and lowered last without making the vessel charge around her anchor. This heavy sail could be left standing for long periods in moderate weather and didn't have to be furled every time the anchor was let go, important to a coaster who had to anchor frequently and was usually shorthanded.

Second, the sails are progressively smaller and closer together as you go forward. This is aerodynamically good. The flow off each sail, if they're all set right, sheeted right and can be made to hold their shape, smoothes out the airflow along the lee side of the next sail aft. That's the reason for the two headsails. A single jib to the bowsprit end would be too

Bolger on Design Rig 84 Baldheaded Gaff Rig

far from the foresail to help its airflow much. So the small forestaysail is set as a leading-edge slat for the foresail and the jib is added for its own sake.

In heavy weather the jib is furled since the rig isn't stiff enough to keep its luff tight. The forestaysail continues to have a good effect on the foresail. A deep reef is pulled down in the mainsail. The result is a snug rig, well balanced and good for maneuvering since there are still sails at each end of the boat, imposing little strain on the hull.

In a gale the schooner lies under her foresail, sheeted flat and reefed if necessary, with her helm lashed down hard. She'll usually lie steadily and make a square drift. The furled mainsail has some effect as a riding sail.

A schooner's mainsail has the same requirements as that of a sloop, gaff, jibheaded or whatever, though it's not as powerful because the foresail isn't as well-shaped or well-located to help it as is a sloop's jib.

The foresail is the weak link. Its boom is usually shorter than it should be for the height of the sail. If a schooner is to be even respectably close winded, and if she's to be really good on a reach, the foresail sheet has to be effective in holding the boom down. The traveler horse should be extra-long with adjustable stops, and no part of the sheet should lead over to the weather side. In the cartoon the foresail is only 65 square feet. I didn't have the heart to take the sheet in to the foremast as I'd do in a bigger schooner. With this little sail it'd be best to have the standing end of the sheet on the horse and shift the fall to a cleat on the lee side for each tack. Reaching, the foresail should have guys and kicking straps ready when needed, whatever it takes to pull the boom down because that's what it takes to flatten the head of the sail. If the head sags, the schooner is dead.

As for the headsails, again they're like a sloop's or cutter's but easier to stay and sheet because they're smaller, which is one reason for having a schooner instead of a cutter. It's usually not hard to get the forestay and the jib's luff set up tight enough for good windward work. Since a schooner's foresail isn't effective before the wind, the foremast shrouds can be brought well aft or the running backstays can be set up to a point that will allow the close-hauled foresail to clear them.

A schooner's foremast ought to be at least as big in diameter as the mainmast, regardless of the relative lengths, and it should have a long step or otherwise be designed to stand the compression put on it in tightening the headsail luffs.

The cartoon shows a sailplan that is small and low for its base length. It's obviously possible to make a schooner rig taller than this one without much change in the general layout. The rule of thumb is that the luff of the foresail shouldn't be more than twice the length of the foot. If the hull is so heavy for its length that it's undersparred when that rule is observed, it shouldn't be given a schooner rig.

It's worthwhile for anybody interested in schooners of this type to reread Kipling's *Captains Courageous*. People better qualified to judge than I all agree that the background minutiae in that book are absolutely correct. The movie is a travesty, though memorable for the sequences of the big fishing schooners sailing hard.


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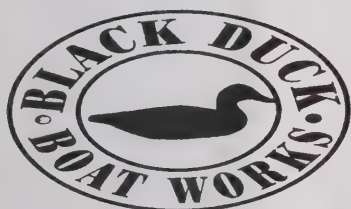


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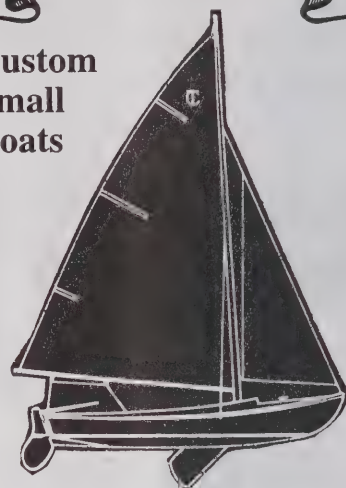
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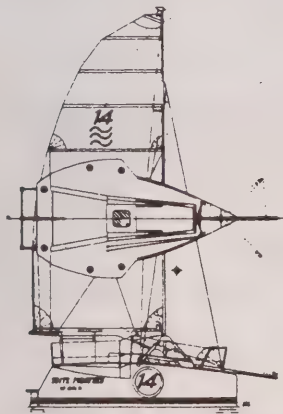
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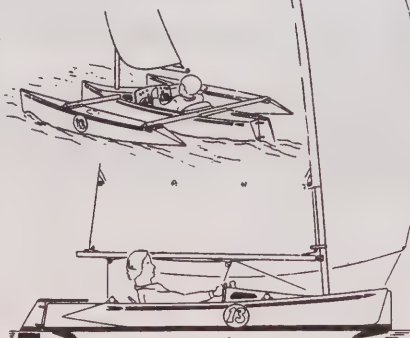
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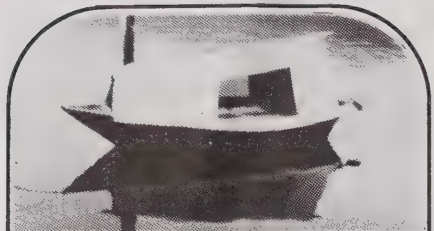
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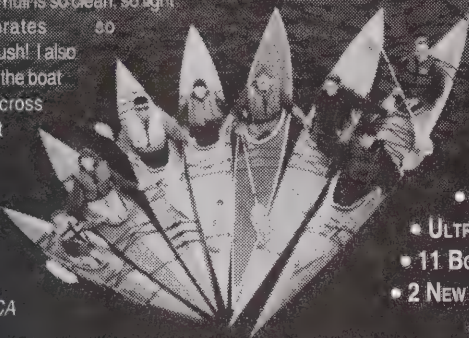


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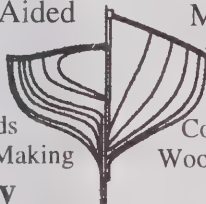
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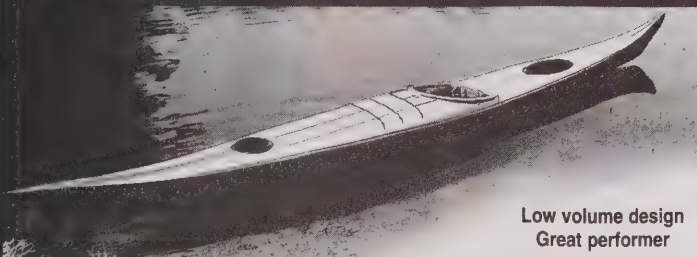
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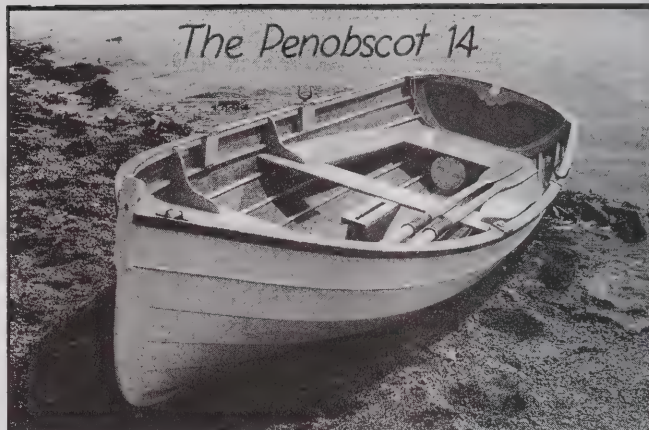
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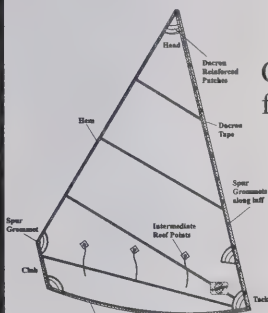
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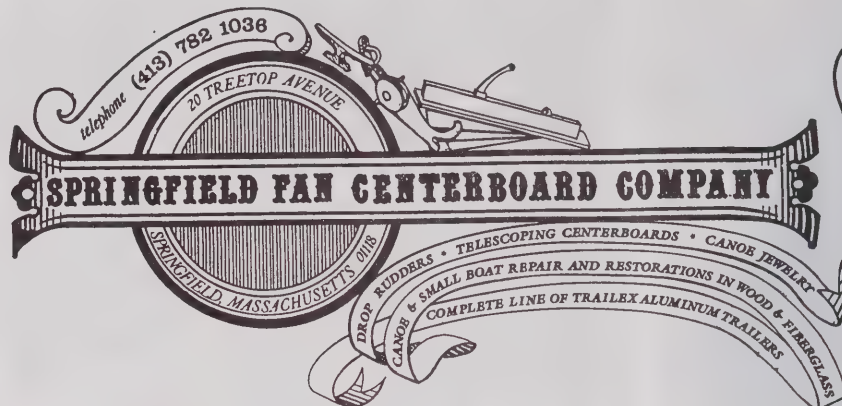
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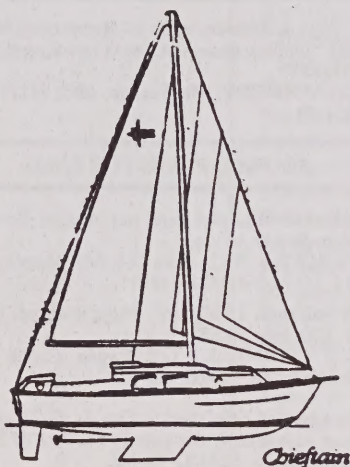
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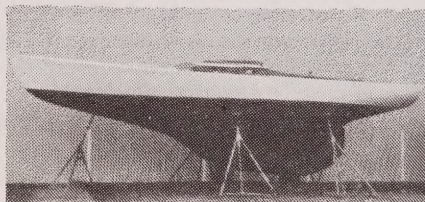
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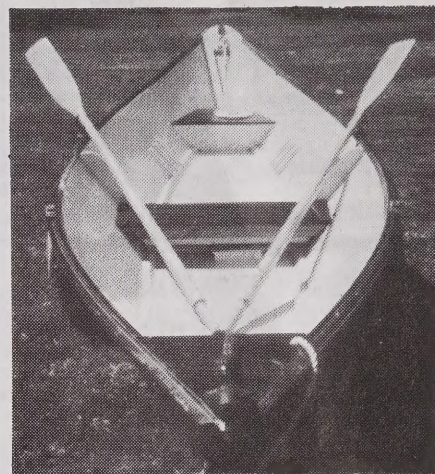


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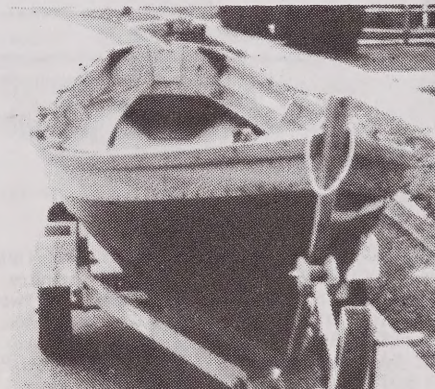


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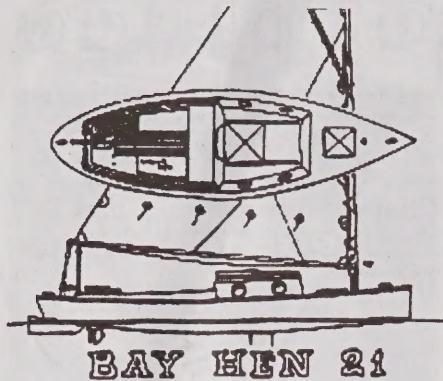


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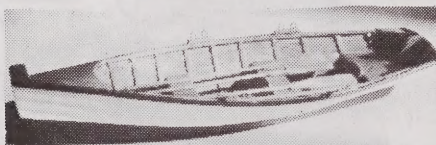
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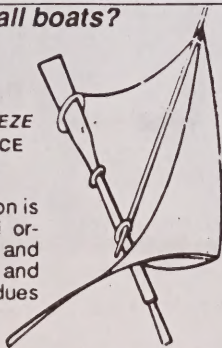
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The Traditional Small Craft Association is a non-profit tax-exempt educational organization which seeks to preserve and encourage the design, construction, and use of traditional small craft. Annual dues \$15 (Tax Deductible)

Write to: The Secretary
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Wooden Canoe Heritage Association

The WCHA is dedicated to studying, preserving, building and using wooden and birchbark canoes.

Members receive our bimonthly publication, *Wooden Canoe*, and have access to books on canoe building, reprints of important articles, and historic canoe manufacturers' catalogs. Visit our web site at <http://www.wcha.org>

Membership is \$20 a year. For more information please contact: WCHA, PO Box 255, Paul Smiths, NY 12970. Phone/fax/email: (518)327-3259 • (518)327-3632 Fax • quenelj@paulsmiths.edu

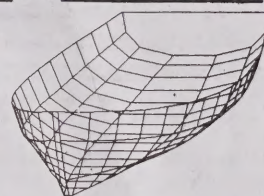
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- **Bulkhead dimensions at any location**
- **Instant calculations of:**
 - Displacement
 - Center of buoyancy
 - Prismatic coefficient
 - Block coefficient, etc.
 - Displacement curve of areas
 - Righting moment
 - Righting arm
 - Centroids of submerged sections
 - Wetted area
 - Surface area of hull
 - Lateral area
 - Center of lateral area
- **Prints out:**
 - Table of offsets
 - All graphics
 - Plywood layout graphic
 - Plywood layout offsets
 - Table of design inputs
- **Printer support:**
 - Laser or ink jet
 - Epson or IBM
 - Proprinter dot matrix
- **Sail rig design:**
 - Sail graphic
 - Jib + two masts
 - 20 sail types
 - Bowsprit



Center of effort of each sail
Center of effort of sail group
Lead of sail vs. lateral area
Table of sail design

- **CAD export:** (use for cabins, decks, etc.)

.DXF file 2D hull
.DXF file 3D hull
.DXF file plywood
.DXF file sailplan

- **Modeling:**

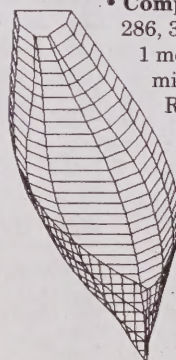
Scale up or down .01 to 10X

In model scale do:

Table of offsets
All .DXF files
Plywood layout
Bulkheads

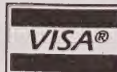
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needed
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Brokerage Boats

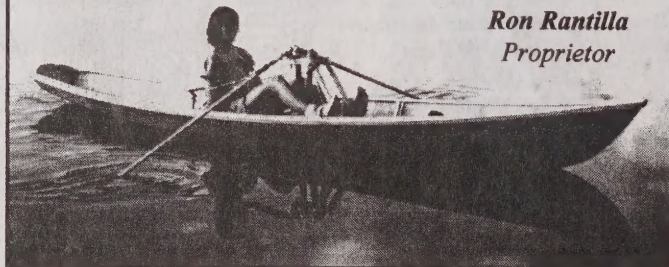
1992 14' Wayfarer Dinghy	1996 21' Sea Pearl (demo)
1970 15' Watkins	1977 22' Catalina
1995 16' Windrider (demo)	1986 23' Rob Roy w/diesel
1986 16' Sea Pearl (motor sailor)	1986 23' Rob Roy
1984 17' Mud Hen (camper)	1970 27' Morgan
1975 17' Vagabond	1991 28' Sea Pearl
1982 18' Buccaneer	1995 28' Sea Pearl (diesel)
1982 18' Sailbird Tri	1979 30' Catalina
1965 19' O'Day Mariner	1977 33' Hunter
1995 19' Seaward Fox	1976 33' Presto (diesel)
1989 20' Sovereign	1971 36' Gulfstar Motorsailer
1986 21' Dovekie	1978 36' Prout Catamaran
1989 21' Sea Pearl C/B	1991 40' Brown SeaRunner Tri
1995 21' Sea Pearl Tri-21	

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